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EDMUND RUFFIN, EDITOR AND PROPRIETOR.

LUCERNE, OR FRENCH CLOVER.

From the New England Farmer.

A correspondent asks for information respecting *lucerne*, particularly whether any experiments have been made with it in this section of country. We wish some of our friends would give us information on this subject; in the mean time the following selections afford the best answer we can give our friend at present.

"I have read with great interest the letter of Mr. John Lowell, in the Monthly Genesee Farmer of November last, and quite concur with him in his opinion of the value of lucerne. My impression is that two or three acres of it used for soiling cattle, would add one-third to the produce of a farm of one hundred acres, both from the greater number of cattle that could be kept on the farm, and the larger quantity of manure that could in consequence be made, so that its good effects would be seen in all the crops. I beg to offer you the result of my experience in cultivating it here.

"The very rapid growth of weeds in this country is a very great difficulty in the way of the cultivation of clover; so much so, that I have found it impossible to grow it in drills, as the practice is in England. I sowed three quarters of an acre of it in drills in 1834; in 1835 it cost me $53 to weed the crop, yet in 1837 half of it was already choked by the growth of grass, clover and other herbs. Part of it too was killed in hollows where the water lodged in winter. Seeing the culture by drills so unsuccessful, I sowed some lucerne seed broadcast and thickly, in a square plot of sandy loam, in my garden, on the 19th of July, 1836. In two months after this was sown I pulled out a root, which then measured 30 inches from the top of the leaves to the point of the root. In 1837, it was cut on the 9th of June, and on the 9th of every subsequent month to October, growing each month about 18 inches. It was cut also five times in 1838, and if the spring had not been so cold, I think it would have been fit to cut by the middle of May, as it began to sprout in April, but was choked by the cold; the temperature having decreased in the latter half of the month of April. The conclusions which my experience seems to afford, are the following: 1st. That lucerne should be thickly sown, (Mr. John Lowell says 20 lbs. to an acre,) upon sand or sandy loam, with slopes sufficient to carry off water, and without hollows in which water can lodge. 2d. That in order to prevent grass and weeds creeping into the lucerne, there should be a border round it of 5, 6, or more yards in width, in which should be grown every year, mangel wurtzel, potatoes, or other roots which require the soil to be well weeded.

"Lucerne would be best, preceded the previous year by a crop of potatoes to prepare the land, and as it needs not be sown till the end of May or early in June, the land may be ploughed once or twice previous to the sowing.

"Lucerne will grow vigorously on pure sand; for a gentleman who has recently resided at Dunkirk in France, tells me he was surprised to see its great growth on the pure sands adjoining that town.

"I have known lucerne to continue to grow for sixteen years in England."—*Genesee Farmer.*

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The following dialogue is from the pen of the author who furnished those published in our previous numbers. We take it from the '*Cabinet of Agricultural Knowledge.*'

We are happy to announce that the author of those interesting dialogues is about to publish them in book form, revised and enlarged. The book will be a valuable one in every farmer's family.—*Farmers' Cabinet.*

Dialogue between a father and son—Lucerne.

Frank.—Father, you said you would tell me more about the island of Jersey—since then, I have seen an account of the growth and produce of lucerne—a crop which you say grows there—which is truly astonishing. I find that it yields four crops for hay during the summer, and after that, abundance of feed for cows and sheep. Is it a species of meadow grass or clover?

Father.—It is much like a narrow leaved clover, but the blossom is very unlike, being of a beautiful blue color. The growth and produce is, as you say, truly astonishing; and having had repeated opportunity to make myself acquainted with the crop and in every stage of its growth, from its cultivation, I am able to speak very decidedly to its great superiority over every other, provided the soil be suitable, and the culture well attended to. The crops to which I allude were so remarkably productive, and I had such constant access to them, that I was induced every evening to enter into a journal, whatever had transpired during the day, worthy of observation; but for this circumstance, it would be out of my power, at this distance of time, to speak so decidedly as to their rapid growth and large yield: I have now, however, an opportunity to quote *chapter and verse* from this journal, which I will do, for your information.

The Rev. Mr. P. having a field of an acre and a quarter, which had been suffered to run to weeds and bulrushes, determined to clean it, and seed it with lucerne; he had it therefore trenched with the spade, to the depth of the staple of the land, which was in some places very shallow, the substratum being a hard gravel. By this operation, the richest part, or surface soil, was turned down on the gravel, and the subsoil was brought to the surface, to be enriched by future dressings. The work was done for fifty cents per perch, of twenty-two feet square, and the seed was sown broadcast and harrowed in by hand. On the appearance of the plants, they were not supposed thick enough to form a crop, but by careful management the field has produced immense crops, both of green food and hay. The journal commences with

Field No. I.

September 13th. Mr. P's field of lucerne, measuring one acre and a quarter, after soiling two-

horses and a cow during the whole of the summer, has already given three crops of hay, on that part of the field which has not been cut for soiling, to the estimated quantity of five tons. The fourth crop, now growing, measures two feet in height.

Sept. 21*st.* The fourth crop of lucerne mown this day for hay.

Sept. 24*th.* The hay carried in in excellent condition: the weather having been dry and hot, the only preparation requisite was, to turn the crop once; this crop is equal to any of the preceding cuttings.

Sept. 26*th.* A portion of the field from whence gravel had been dug, and the part levelled, has always dried up after producing one crop of hay in the summer, the substratum being impenetrable: that spot has this day been covered to the depth of five inches with fresh earth, preparatory to trenching and resowing.

Oct. 18*th.* The trenching of the gravelly spot has been delayed, but the shoots of the lucerne have penetrated the earth through a space of five inches, and it is now determined to allow it to remain untrenched.

Nov. 23*d.* A fifth crop will not come to sufficient maturity for hay, but there is excellent food for horses and cattle.

April 8*th.* The gravelly spot is the best and earliest part of the field; scarcely an inch in space, without a vigorous shoot of lucerne.

May 6*th.* Commenced mowing the crop of lucerne for soiling, a remarkably heavy crop, more than two feet in height.

11*th.* The first crop mown for hay this day. A space six feet square, taken as a fair average of the field, yielded twenty-three pounds in weight as soon as cut; after one day's exposure it had lost eight pounds in weight, showing that a gallon of water had evaporated in twenty-four hours from this small quantity of green food.*

23*d.* The hay carried in in good condition—not injured by five rainy days, the crop lying light, by means of its large stalks, requiring only careful turning now and then.

June 26*th.* A second crop mown for hay, measuring two feet eight inches in height. The weather has been remarkably hot and dry, the result has been, a growth in the crop of two inches in height every twenty-four hours, the last four days.

July 17*th.* The third crop of lucerne measures seventeen inches in height; the weather is extremely hot and dry, all the meadows are parched, and farmers are compelled to feed their cattle on hay; the lucerne grows away as though it had a shower every night.

22*d.* The crop on the gravelly side has again failed; a first and second crop come earlier and grow more vigorous on this part of the field than on any other; but after that, it suffers from a want of depth of soil, affording a familiar illustration of the parable of the sower, (Matth. xii. 5th and 6th verses.) The seed which fell on stony ground immediately sprang up because it had not much depth of earth, and consequently soon felt the influence of the sun, but when the sun was in full vigor, it was parched, and for want of nourishment withered away.

Aug. 7*th.* The third crop of lucerne mown this day for hay; a very heavy crop, many of the plants in blossom. From the first to the second mowing, one month and fifteen days; from the second to the third cutting, one month and eleven days; and after this the field was rented to a tenant for £30 sterling per annum.

Field, No. II.

Sept. 5*th.* A piece of land was sown this day with lucerne seed of this summer's growth, unaccompanied with any crop.

March 20*th.* The lucerne sown on the 5th of last September, with seed of that summer's growth, has stood the severity of the winter, and the crop measures six inches in height this day.

May 4*th.* Cut the first crop of lucerne this day, two feet in height.

June 14*th.* A second crop mown this day, equal to the first.

July 14*th.* The third crop mown this day, twenty-six inches in height.

August 24*th.* The fourth crop was mown this day, equal to any of the preceding.

Sept. 5*th.* It was on this day last year, that this crop was sown with seed of that summer's production: the fifth crop from which measures a foot in height this day.

Field No. III.

Major T. sowed a field with lucerne, in May of last year, unaccompanied with any crop; three heavy crops were taken for soiling during the summer, and on the fourth of May of the present year, it was mown for hay, a very heavy crop: thus giving four crops in the space of one year from the time of sowing the seed.

Field No. IV.

Colonel T. has a field of lucerne of four acres, in full vigor; the crop, after cutting, measured three feet seven inches in length. He mowed a third crop for hay from this field on the 21st of July.

Field No. V.

M. A., esq., in breaking up an old unproductive meadow, for the purpose of seeding it with lucerne, adopted the following mode. In September, the land was ploughed to the full depth of the soil, and sowed with winter tares, or vetches. These were cut for hay in May, and yielded three tons per acre. The land was immediately ploughed and repeatedly harrowed, and the weeds were collected and burnt: a plentiful crop of seed weeds soon made their appearance, which were ploughed down; the land was again harrowed, and the weeds were again collected and burnt: this was repeated until the soil was as clean as a garden, when it had a very thick coat of well rotted stable dung, which was very carefully turned in, and lucerne seed was sown in September, without any other crop; and during the next summer it was cut five times, either for soiling or for hay: the fifth crop for soiling was commenced cutting on the 25th September.

So far the journal, which needs no comment.

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From the Zanesville Gazette.

LUCERNE, OR FRENCH CLOVER.

Lucerne, sometimes called "French clover," is a kind of grass, which, in some situations in Europe, is cultivated with great advantage, and has

* Twelve tons, eight hundred and fifty lbs. per acre.

been tried in some instances with great success in this country. It is not, strictly speaking, a *clover*, though in some respects similar. It is perennial—in favorable soils, the roots are said to live and flourish a hundred years. Its advantages consist in affording a greater amount of foliage for any kind of stock, than any other plant, according to the expense of producing it. Several years since, while residing in the state of Maine, we made several experiments with lucerne, which, although some of them terminated unfavorably, satisfied us that the most favorable soil for it is a deep sandy loam: and as the alluvial soils on this river are generally of this character, we last spring resolved on giving it a trial here. We procured from Boston, a small quantity of seed, which was sown on the river "bottom," the last week in May. As the soil had been badly managed for several years previous, we had feared that the great growth of weeds would check and smother the lucerne, and to guard against this, and get a chance to extirpate the weeds, we sowed the seed in drills. This was done very expeditiously and exactly, with one of Ruggles, Nourse & Mason's seed sowers.

In the latter part of the month of July the lucerne had reached the height of 18 inches on an average, and had considerably blossomed. We cut it and fed it green, partly to hogs and partly to milch cows—both ate it voraciously.—In just *four* weeks from the time it was cut, it had again grown to nearly the same height as before, and was cut a second time—and the first of November it was cut a third time—the crop being heavier than either of the preceding. A piece of common red clover [very flourishing] immediately adjoining, the soil precisely similar, did not yield near *half* as much in proportion, as the lucerne.

We have no doubt that it may be cut five times another year and will yield at the rate of a ton and a half of *hay* to the acre, at each cutting.

AGRICULTURE OF FRANCE.

(Continued from page 270.)

Potatoes have not been long cultivated, even as a garden crop, in France, and as a field crop to any extent, or under good management, they are yet comparatively little known. The Lyonnois was one of the first districts in France where they were cultivated. At their introduction, they were called white truffles, from the root resembling the truffle in form, and from their being dry, like a truffle, out of the ground. It is computed, that since this valuable root was brought into general use in the Lyonnois, the consumption of corn has been lessened one-third; the inhabitants give them to their cattle and poultry, and the poultry of this district is highly celebrated. Soon after M. Turgot was appointed intendant of Limoges, A. D. 1761, he introduced into his generality the cultivation of potatoes. The people at first regarded this root with apprehension, or disdain, as beneath the dignity of the human species; and they were not reconciled to it, till the intendant had caused it to be served at his own table, and to the first class of citizens, and had introduced it among the fashionable and rich. At present, a vast quantity of potatoes, of a tolerably good quality, are grown in the provinces of Poitou, Normandy, Limosin, Gatinois, and the Isle of France, as well as in less quantities in other districts.

Cabbages are cultivated in French Flanders, Alsace, and a few other districts. In the neighborhood of Strasburg, particularly, this plant is cultivated on a very extensive scale, but almost entirely for the consumption of Holland and Mentz, to which places it is calculated that cabbages to the value of above 30,000 crowns are sent annually. In French Flanders, the *brassica arvensis* of Linnæus, there called Colza, is cultivated in astonishing quantities by the farmers. There are two kinds of colza, one called white colza, because the leaves of the flower are white; the other, cold colza, the leaves of which are larger and thicker. It has this name, because it supports better the rigors of winter. This plant is cultivated on rather a strong rich soil. There are two modes of sowing it; either in a nursery to be transplanted, or in the usual mode. The white colza requires less manure than the cold colza. The seed is commonly ripe about the end of June or July. The plant is cut with a sickle, having a sharp edge. Colza, intended solely for winter food, is sown in June, in a field prepared for the purpose; it is cut, and given to the cattle in the course of the winter; and afterwards the stalks are cut some inches above the surface of the earth, and they will furnish a second crop of leaves in the spring. Colza furnishes the best oil that can be extracted from the soil of the north. In the central parts of France, the oil of walnuts supplies the want of the colza, which is but little cultivated there. The mass remaining after the extraction of the oil, makes a good winter food for cattle. The corn that is sown after this plant is generally both abundant, and of excellent quality.

Rape is extensively cultivated in French Flanders, Artois, &c., but not in the other districts of the kingdom. The plants are raised on a small quantity of ground that has been fallowed, well dunged and worked repeatedly by the binot or plough. The rape is afterwards transplanted into a field, that had formerly produced winter barley, or winter wheat. The young plants are put into the ground, either by the dibble, or by the plough. Rape is grown either as green food for sheep, or for the sake of the oil. The latter is the more common, as well as the more profitable. In a small circle round Lisle, there are 450 windmills for extracting oil from the seeds produced in that neighborhood. In the year 1810, the product was estimated as follows: 1st, 180,000 pictolitres of oil, at 109 francs each, in English money 817,580*l.*; 2d, The cakes valued at one-sixth part, 136,260*l.*; the total value of the produce 953,840*l.* The crops of wheat after rape in French Flanders, are reckoned to be better than those that are grown after fallow. Poppies are also cultivated in the northern districts of France for their oil.

In the same district of France, where indeed the most spirited and successful agriculture is carried on, spurry (*spergula arvensis*) is cultivated. After the crops have been reaped, the grain is slightly ploughed and sown with it. In October, the cows are tethered on it. The butter from the milk thus obtained, is called spergula butter, and it is employed for the use of the kitchen, as being both cheaper and more profitable than any other for that purpose.

In some parts of Brittany, parsnips are cultivated. The seed is sown in February or March, and the parsnips are raised out of the ground in October or November. They are chiefly employed in fattening cattle and hogs. Lupins (principally *lupinus albus*) are grown very extensively in the southern districts, either on the wheat stubbles, as winter food for their flocks; or for the sake of the seed, which is eaten by the inhabitants. Of all the species of clover, trefoil, or yellow clover, is most abundant, especially in the south. It is generally sown as forage on the wheat stubbles. In the district of the Pyrenees, these are ploughed in the beginning of August, and the clover seed is harrowed, or rather rubbed in, by means of a piece of wood fixed to the plough. This clover produces much luxuriant and valuable food for sheep and lambs early in the spring, after which it is watered, and produces by the end of May a full crop of hay; it is then ploughed up, and haricots, maize, or millet planted, either of which is off in time for putting in wheat. The other kinds of clover, till very lately, were scarcely met with any where, except in French Flanders; but within these very few years, what the French call *prairies artificielles*, which were less properly artificial grasses, have been introduced into several districts. Still these and turnips, the two grand distinguishing features of good husbandry in Great Britain, are comparatively little known or valued in France.

The case, however, is very different with respect to lucerne and sainfoin. The culture of the former is one of the principal features of French husbandry. It is the *medica* of the ancients, so called because it came originally from Media; and and spreading through Persia, it became at length known to the Greeks, who cultivated it assiduously, and recommended it highly. From Greece it was transferred to Italy, and before the time of Cato or Virgil, it was in the highest credit with the Romans. It flourished with them as long as their empire flourished. Before the destruction of the empire, it seems to have been carried into Spain; or perhaps it was introduced there by the Moors, with whom, during their abode in that country, it was in high esteem. When the arts revived, it returned again into Italy, and was assiduously cultivated in that country, especially in the kingdom of Naples; thence it advanced into the southern part of France; and from the place where it was first or principally cultivated, it was called *grand trefle, trefle*, or *foin de Bourgogne*. The era of its introduction into France is not accurately known; but as it passed from that country into the Palatinate upwards of 250 years ago, it of course must have been longer cultivated in France. It is now grown in Picardy, Isle of France, Rousillon, Languedoc, Gascony, Poitou, Touraine, Artois, Normandy, Dauphiny, and Provence, to a great extent, and partially in other districts of the kingdom. It is invariably sown broadcast, and generally without corn, though sometimes with oats. It is cut for the first time, in the southern districts, about the end of April; in the northern districts of course later. Where irrigation is practised, it is watered every 40 days after the first cutting, to the extent of five cuttings in all. If the land be not watered, it is cut thrice with a full product, where the soil and climate are favorable, and the management good. The watering, however, brings it to maturity, or rather decay, comparatively quickly, since in this case its duration is not above seven or eight years, but on other lands twelve, sixteen, twenty, and even thirty years. In some parts of Rousillon, they take three crops of wheat after lucerne. This crop is apt to get weedy. In which case, in some of the southern districts, it is cleaned by means of ploughing it in the winter with a narrow pointed share, during frosty weather. This operation, performed at this season, kills the weeds, but does not injure the lucerne. Where the land is not very rich, or where it is not intended to crop it severely, the practice of sowing wheat after it, is not pursued; but barley and oats cut green, or made into hay, and not suffered to ripen, are taken. By this management, the roots of the lucerne, which are not easily or soon eradicated, and which would prove injurious to crops of corn, are turned to advantage, the shoots from them mixing with the forage of the barley or oats. The produce of course varies considerably in weight. In the neighborhood of Liancourt, where it is well managed, three cuttings will yield 1600 bottles of hay, each of 12 lbs. or 19,200 lbs. which is above seven tons the English acre. In general, the crop may be estimated at 12,000 lbs. or rather more than five tons the English acre. The hay made from the two first cuttings, is generally given to horses. The hay from the three cuttings to cows. We have been thus particular in our account of the lucerne husbandry of France, since, as we have already remarked, it forms one of its best and most ditinguishing features.

Sainfoin is not nearly so generally cultivated, and certainly by no means so well managed, nor so valuable a crop, either in its actual produce, or as a preparation for other crops, as lucerne is. In England, sainfoin generally lasts from eight to twelve years. In France, it seldom lasts more than four or five years. It is usually sown with a second or third crop of corn; and, in some places, the farmers do not think of this grass till their lands are so full of weeds, and so exhausted, that they will produce corn no longer. This management, and the circumstance that their leases are generally short, seldom extending beyond nine years, sufficiently accounts for this crop not being kept in the ground so long as it is in England; for certainly, with respect to soil, France is peculiarly favorable for this crop; and yet in some of the districts where it might be introduced with great advantage and profit, it is not grown. The culture of tobacco was formerly prohibited in France, except in certain parts: as Pont de l'Arche, Normandy, Vertus, in the department of the Marne, Picardy, Mont Auban, Tonnung, a small town in the department of the Lot and Garonne, Clerac, another town in the same department. Hainault, Artois and Franche Compté were similarly privileged; but the soil of these provinces was decidedly hostile to the cultivation of the tobacco plant. At present, it is principally cultivated in Alsace. The average produce of France is estimated at twelve millions pounds annually; but the quality is not good.

It has already incidentally appeared, that millet is cultivated to a considerable extent in the southern districts of France. In some parts of Gascony, it is sown on three feet ridges, with three irregular rows on each ridge, and carefully

hoed. In other parts, it is sown ridge for ridge in the same fields with rye. In order to free the millet from its chaff, the French pound it in a wooden mortar, or pass it between millstones, which they keep sufficiently asunder, to prevent the grain being crushed. In the southern parts of France, especially in the vicinity of Bourdeaux, they prepare from the winnowed millet seed boiled in milk, a very favorite mess, not unlike rich milk; they also make the seed into cakes, pastry, &c. Millet is a grain, that thrives well under irrigation, which is liberally bestowed upon it in the district of the Pyrenees.

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The harvest in the south of France generally commences about the middle or end of June, in the central provinces about the middle of July, and in the north of France about the beginning of August; but in the high grounds, especially in Auvergne the harvest is very late, oats being not unfrequently green in the middle of August. It has already been mentioned, that women are principally employed in the harvest operations: indeed, agricultural operations of all kinds are conducted more frequently, and on a more extensive and independent scale, by them in France than in most other countries. The Hainault sickle is used in French Flanders, and in parts of the north and east of France: The sickle more generally, and the common scythe in some districts, even for the wheat. The harvest operations are by no means carried on with neatness or method; and the excellence of the climate is such, in most parts of the kingdom, that these deficiencies are seldom attended with much loss.

Scarcely any corn stacks are to be seen in France; by far the greatest part of the corn being either put into barns, the size of which, in some districts, is enormous, or thrashed out immediately after harvest, in the open fields; this mode of thrashing, however, can be practised only in the southern parts of the kingdom. There harvest is not considered as finished till the thrashing is done. Where it is performed by the flail in the open field, the thrashing-floors are generally in a corner of it, thrashing-floors they may be called; for all the preparation is merely shovelling aside the loose mould, and a good sweeping. The size of course is in proportion to the number of people, which is from two to twelve; rarely more than the latter. They thrash and winnow about seven Winchester bushels in a day. Where the corn is trodden out, instead of being thrashed by the flail, horses and mules are employed: oxen, which are used in most of the other operations of husbandry, are seldom or never employed in this. The number of horses or mules varies: sometimes there are four mules and four men; sometimes only two mules and two men; sometimes twelve or fourteen mules or horses together, and sometimes even as many as twenty-four. The mules or horses, as well as men, are generally hired, at forty sous for each mule or horse, and the same for each man: the latter have their board besides. With 24 horses or mules, their drivers (who are paid in kind, three sacks per hundred of the grain thrashed,) and 15 men, it is calculated that they can thrash of wheat from 120 to 180 bags of 200 lbs. per day; at an average of 150 bags per day, it costs about 4*d*. per English bushel. The common practice is to lay three or four layers of wheat, barley, oats, &c., upon some part of the field, generally under a central tree: the horses and mules are then driven upon and around it, in all directions, a woman being in the centre, like a pivot, and holding the reins: the horses are sometimes driven by little girls. The corn thrashed out is cleared away by the men; others winnow it; others heap it; others supply fresh layers. After the corn is separated, they continue treading the straw, until it is reduced almost to chaff, to improve the fodder, and forward the maturation of the dung. Such is the stability of the climate, that this process is going on in the open air, through the whole country, without any means of protection against a sudden change. Indeed a soaking rain could not possibly do harm, as a day's sunshine, or even the heat of the night, would soon evaporate it.

The means used in France to improve the soil or particular crops are, manures, draining, paring and burning, and irrigation. In most of the districts, there is nothing very peculiar in the manures employed, or in the mode of managing them. The small towns and villages, in the autumn, present a disagreeable scene; from one end to the other they are littered with straw, like a farmyard, for the purpose of its being converted into a manure, so that it is like walking all the way upon a dung-hill. When the straw becomes sufficiently saturated, it is piled on each side the door of the proprietor's house, to make room for fresh straw being laid on; so that, besides the dung-hill in the street or path, there is a range of them on each side. In French Flanders, very minute and particular attention is paid to the subject of manure. In the vicinity of Lisle, the dung of cattle and horses with the straw, ashes, lime; the urine of animals collected with care in brick cisterns; the cakes of rape and hemp-seed reduced to powder in a mill, and sometimes put in the urine cisterns; sour water, obtained by washing the tubs of starchmakers; the urine of cattle fattened at the distilleries, which sells at a high price; the dung of pigeons; that of sheep carefully gathered; marl; the refuse of horns, and night soil, are carefully and judiciously employed. Although the price of this last article is only 3*d*. per ton to the scavengers, and 9*d*. to the farmers, the town of Lisle alone produces as much as would sell for about 4200*l*. a year. Besides these manures, Dutch ashes are extensively employed as a dressing for clover: these are the ashes of the peat or turf, brought principally from Friesland: by their application, great crops of clover are raised, and the subsequent crops are also improved. From the nature of the soil and climate, draining is requisite only in very few parts of France; and in the practice, there is nothing particular or commendable. The marshes in some of the sea districts have been partially drained, but this improvement is by no means carried on with spirit. Louis XIV, made a present to Marshal Turenne of the marshes of Bourgoigne, in the department of Isere, on condition that he would drain them; but neither he nor his successors have ever accomplished it. In some provinces, a singular kind of husbandry is practised; the ponds are drained, and cultivated for a few years, till they lose their fertility, when the water is again permitted to accumulate, and the same process is repeated. Respecting paring and burning, which

is very partially practised, and scarcely ever for any other purpose, or at least with any other effect, but to impoverish and exhaust the land, it is unnecessary to enter into details.

Irrigation is the most remarkable feature in the mode of improving land in France, or to speak more correctly, in the mode of increasing its fertility,—and its effects are wonderful. Irrigation, however, is by no means general: in travelling from Calais to the Pyrenees, Mr. Young observes, he first met with it in La Marche, between La Ville au Brun and Bossie, after he had passed over considerably more than half the kingdom; thence it is practised, with little interruption, to the Pyrenees, and the whole district of those mountains from Perpignan almost to Bayonne is watered. Through all the north of France, comprehending every thing north of the Loire, there are only a few imperfect traces of it in some parts of Normandy, and in the Beauvoisis. In Picardy, Flanders, Artois, Champagne, Franche Compté, Burgundy, and the Bourbonnois it is unknown. In Alsace and Lorraine, it is partially practised for their meadows. On the whole, hardly more than one third of the kingdom can be said to understand and practise irrigation.

But where it is practised, it is upon a large scale, and with wonderful spirit and success. By means of it, artificial fertility is conferred on some of the barren mountains of the Cevennes. As the waters that run down the sides carry considerable quantities of earth into the ravines, walls of loose stones are constructed, which permit the waters to pass when they are clear; but when turbid, their load of earth is gradually deposited against the wall, and afford a quantity of excellent soil. Successive ramparts are thus erected to the very top of the mountain; and the water having no longer a violent fall, nourishes, instead of injuring the crops. In order to give security and consistence to the new acquisition of soil, fruit trees are planted at certain intervals. Perhaps the greatest exertion in irrigation to be seen in France, occurs in Languedoc, in the vicinity of the town of Gange: a solid stand of timber and masonary is formed across a considerable river between two rocky mountains, to force the water into a very fine canal, in which it is, on an average, six feet broad by five deep, and half a mile long, built on the side of a mountain, and walled in; a wheel, with a hollow periphery, raises a portion of the canal to the height of 30 feet; an aqueduct conducts it on arches built on the bridge, across the river, to water the higher grounds; while the canal below carries the larger part of the water to the lower fields. Meadows are watered in some parts of Gascony, and in the vicinity of Avignon;—an unusual thing in the south of France.

But the most extraordinary instances of irrigation, are to be met with in the singular desert of La Crau, already described, and in the Pyrenees. In advancing from Salon into the Crau, about four miles before it commences, the road crosses the canal of Borsgelin. "The old canal of Crappone, at the same place, is seen distributing water in various directions, for the amelioration of one of the most arid tracts that is to be met with in the world. The canal of Crappone takes its water from the Durance at La Roche, and carries it to the southern part of it at Istres. This canal is 40 miles long. That of Bois Selin receives it from the same river at Malavort, and crossing the other, divides it into three branches: one of which leads to the lands in the neighborhood of Istres; the second to St. Saumus and Magran, and this part of the Crau; the third is a small one that turns to the left towards Salon. In consequence of water being thus conducted to a region where it is so much wanted, some very capital improvements have been wrought. Some large tracts of the Crau have been broken up, and planted with vines, olives, mulberries, and converted into corn and meadow." The corn has not succeeded; but the meadows, according to Mr. Young, are amongst the most extraordinary spectacles that the world can afford, in respect to the amazing contrast between the soil in its natural and in its watered state, covered richly and luxuriantly with clover, chicory, ribgrass, and *avena elatior*.

In describing the irrigation of the eastern Pyrenees, we shall use the words of Mr. Birkbeck, who in his tour through France in 1814, observed every thing relative to its agriculture with the eye of a most shrewd and intelligent observer, and who has recorded his observations in the most clear and impressive manner.

"The copious and pure streams issuing from the Pyrenees, from their source to their union with the Mediterranean, are most economically and skilfully directed to the purpose of irrigation. On the mountain sides, the streamlets, as they trickle from the rocks, are collected into channels, above every little portion of arable ground, which they render surprisingly fertile. These rills uniting, form larger streams; and these, with great labor and ingenuity, are kept up by artificial channels, and only suffered to descend as they perform the office of irrigation. The same attention is paid to the larger streams united, which become a considerable river in the lower lands of Rousillon. This is divided and subdivided, unites, and is again divided, so that every portion of the surface seems to enjoy its due share. The soil of Rousillon is sandy, and apparently not very rich; but, by the joint influence of water and sun, vegetation is vigorous beyond any thing I had ever before witnessed. Where a mountain side, or a portion of the land, is so situated, as to be inaccessible to the water, it is planted with vines, to which watering is not applicable, as it injures the quality of the wine, without increasing the quantity sufficiently to compensate. On the contrary, to olives, irrigation may be applied with prodigious advantage, an instance of which came under my observation. This crop had generally failed, owing to the extraordinary coldness of the early part of the summer; and one-half of a large olive ground was, like the rest of the country, without fruit; the other half, which had been watered several times, was laden to a degree equal to the most plentiful season. How this country, and other valleys of the Pyrenees, were originally laid out so judiciously with channels of irrigation, systematically arranged for the benefit of the whole, is a mystery I have not heard explained. A master's hand seems to have planned and executed all, before the appropriation of the soil, otherwise private interest would have interfered and marred the design. However that may have been, every man now finds a "*canal d'arrosement*," passing above his field, and a "*canal de dessechement*," at the

bottom, which latter is the "*canal d'arrosement*," in its turn for the land below.

The manner of applying the water is extremely simple. A dam is made across the upper channel, from which the water flows gently into a furrow made by the plough along the higher side of the field, and in a few hours soaks through the whole soil, until it reaches the lower side, which completes the operation.

The following, which is one of the usual practices of the district, may show what this amphibious husbandry can effect. In August, they *scratch* the wheat stubbles with their little Roman plough, which does not turn a furrow, or move a fourth of the surface. They then sow annual trefoil, which they cover very slightly by planking, that is, drawing a plank on which a boy rides, over the land, thus breaking the clods and smoothing the surface. This is equivalent to our rolling, as the scratching is to our ploughing. The weeds and stubble are but little affected by this process of ploughing and planking. However, that matters not, for the water is now introduced; the trefoil starts as it were instantaneously; and in October or November is three deep and fed off by the sheep. Water is applied from time to time; and in January or February it is fed again; and lastly, in May it is mown for hay, a heavy crop. Immediately as the hay is removed, another scratch is given, millet or haricots are sown, irrigation goes on, the crop is reaped, and the ground receives four ploughings, as a preparation for another crop of wheat, to be sown in October or November. This is the history of one year, under familiar and constant practice."

The richest arable land, when watered, sells for nearly double what land of as good quality not capable of being watered will bring. Besides the districts already mentioned, where irrigation is practised on a large scale, and with great skill and effect, every spot of land in the mountains of the Limosin is watered; and a considerable part of the vale of the Limange of Auvergne, as well as some of the mountainous districts of that province. At Isoire near Clermont, the gardens, are planted in quick succession by means of it. There are also here what they call *vergers;* that is, watered meadows planted with apples and other fruit trees, which are very productive. Irrigation is applied to the culture of hemp in Auvergne.

Besides the improvement of the mountainous districts in the centre and south of France by means of irrigation, by another process, calcareous mountains, which generally rise in shelves, are rendered productive by cutting away the rock behind the shelf, which supplies materials for a low wall around the edge. The interval is afterwards filled with earth, and the barren mountain is crowned with luxuriant terraces.

It must have sufficiently appeared, from the account already given of the agriculture of France, that the meadows and pastures of that country bear a very small proportion to the arable land, and that comparatively little dependence is placed on their produce, for the breeding or fattening of cattle or sheep. Indeed, as the cattle and sheep of great tracts of arable land are entirely supported on clover, lucerne, &c., and as the climate of by far the greatest part of the kingdom is not well suited for meadows or pasturage, the French agriculturists have little reason to regret, or alter this feature in their husbandry. The author of the *Credit National* calculates the meadows at 15,000,000 arpents: that is, at one-fourth of what he makes the arable. But Mr. Young conceives that they do not amount to one-third of that quantity, and estimates the meadows and rich pasturage together at 4,000,000 English acres; not one-seventeenth of the arable land. This seems a very small proportion; but it will not be deemed too small, when it is recollected, that in those districts where in England we find extensive meadows, that is, by the sides of the rivers, there are in France very few, and those very inconsiderable. For instance, the plough moves to the water's edge of the Marne. There are very few meadows on the banks of the Loire. The Seine is bounded either by hills covered with wood, or by gravelly plains under tillage. The land near the Garonne is principally arable; and the Rhone presents rocks and vines on its banks through the greater part of its course. On the smaller description of rivers, indeed, there are meadows, especially on the banks of the Saone; but it is evident that these, taken together, can form a very small proportion indeed of the area of France.

The most extensive, and certainly the most fertile pasturages in France are to be found in Normandy. The moisture of the climate, aided by the generally deep and rich soil of this province, is extremely favorable to the pasture; and as the farmers here are certainly equal at least in intelligence, capital, attention and skill, to those in any other part of France, those advantages are turned to the best account. The grazing lands of the Pays d'Auge are particularly celebrated; and of these, the valley of Corbon may perhaps class with the finest to be found in any country. In 1789, when Mr. Young visited these pasturages, the rent of the highest was about 4*l*.: 7: 6 the acre, measured by the perch of 22 feet; and the price about 87*l*. 10s. the acre. In several of the provinces, there are also salt marshes that are applied as meadows, to the fattening of cattle, particularly in Normandy, about Isigny and Carentan, in Poitou, Saintonge, Languedoc, &c.

The management of hay in general is very slovenly. It is not unusual to see the produce of a field carried away in sheets and blankets, or even in the arms, and one-fifth of the crop lying scattered in the roads and the fields. It is in general too much exposed to the sun. The women here, as in all the other parts of agricultural labor, perform the principal part of the work, even pitching the hay into the cart. The fork they make use of for this purpose is a very awkward one. In the central and southern provinces, where the climate is very steady, the farmer stacks his hay in small cocks where it grows, and only carries it away at his leisure. When carried to the hay loft, being merely thrown together without being trodden, it loses the little fragrance, which a burning sun acting on it, while it was making, had left it. The clover hay, however, especially in the northern provinces, is better managed; after standing for some days in large cocks, it is tied with straw bands, in bundles of 14 lbs. each. The lucerne also, in these districts, is got with great care, so much, indeed, that the color is beautiful; the green is often not in the least faded, but so vivid that it almost appears improved in drying.

Normandy, the Limosin, Auvergne, Brittany,

Franche Compté, Poitou, and Burgundy, are most celebrated for their breed of horses. Normandy has long been noted for its horses. It is said that William I. won the decisive battle of Hastings, by the superiority of his cavalry which he brought over with him. The Norman horses are in general low and thick, and very steady, sure, and strong. They will make a stage of 30 miles without a bait, and eat the coarsest food. They, as well as the horse in other parts of France, and also the cattle, are accustomed to feed about the lanes, and in the common fields, after the corn is carried off. The best saddle horses are those of Limosin. They are seldom fit for riding till they are six or seven years old; but then they are very useful, and last a long time. This breed has been lately much improved, by crossing it with the Arabian, Turkish, and English. Auvergne produces some good hacks for common use. A great many foals are reared in Brittany, which are sent to the pastures of Normandy. A great many horses are also bred in Franche Compté, especially in the hilly part of the country. One year with another, their studs produce upwards of 5000 colts, most of which are bought, when six months or a year old, by the horse dealers in Champagne, Burgundy, Brie, and Berry. The trade in horses is consequently an object of some importance and value in Franche Compté. In different parts of the kingdom, there have long been *Haras, or depots de chevaux*, for the supply of the royal studs; and Bonaparte, sensible that cavalry is one of the main sinews of war, paid particular attention to the breed and supply of horses; but, as in many other things that he undertook, his plans were not calculated to produce the object he had in view, in consequence of the impatience, obstinacy, and tyranny of his disposition. On the whole, therefore, the breed of horses, and probably the number, are not equal to what they were previously to the revolution. In the year 1802, the total number was, of plough horses 1,500,000; horses kept at Paris 35,100; in all other towns 200,000; in the armies 100,000: making in all 1,835,100. With the respect to the number assigned for agricultural purposes, it may appear high, when we consider, that oxen are very much used not only in the plough, but in carts; and that where horses are employed in the plough, there are seldom more yoked than two. The number of horses in Paris is singularly small. Between 1802 and 1812, the number of horses, at least of those bred in the government studs, was probably much increased; but during the Russian campaign, in a few months of 1812 and 1813, the loss, according to the exposé of the year 1814, amounted to 230,000 horses, which it is stated, could not be replaced at a less expense than 105,200,000 francs. The price of farm horses in the northern districts of France is about 17*l.* sterling.

Mules are much employed in the middle and south of France, especially in the latter, for treading out the corn. Anjou carries on a particular trade for these animals, known by the name of *Mirebalais*. In the department of Aveiron, especially in the vicinity of Rhodez, the principal town, they feed a vast number of mules, in which the inhabitants carry on a considerable trade; for it is said that during the two fairs that are kept yearly at Rhodez, this trade brings in above 300,000 crowns. The breed of mules in Poitou, is particularly celebrated for their size and strength, and is in great demand all over France.

The provinces in which oxen and cows are principally bred or fattened, are Perche, Champagne, Lorraine, Alsace, Hainault, Flanders, Normandy, Brittany, La Maine, Anjou, Poitou, Berry, Nivernois, Burgundy, Limosin, Auvergne, Bresse, Languedoc, and Dauphiny. The prevalent color of the cattle in France, from Calais to the Pyrenees, is a pale reddish, or rather a cream color. This is decidedly the color of the cattle of the Limosin, which are an excellent breed, probably the best in France. From this district, numbers of fine oxen, fattened in winter, are sent to the Paris market, which is also supplied by those fattened in Normandy during summer. The cattle of the Limosin have short legs, strait and flat backs, well arched ribs, deep and heavy carcasses, and their weight from 60 to 80 stone, 14 lbs. to the stone. The most singular circumstance respecting them is, that they should be in excellent condition in the month of May, the season when they are usually driven from Limoges to the Paris market, as at this time of the year there is in most countries a scarcity of fat cattle, when they have not been fattened on spring grass; and any grass which they could have in a climate not very different from that of the south of England, could have but a small share in bringing them to the condition in which they reach Paris. The method by which they are brought into this condition is very extraordinary: they are put on grass till the beginning of November; then on *raves* or turnips. When the turnips fail, they give them rye-flour, prepared in a peculiar manner: the flour is mixed with water, so as to make a paste, which is suffered to stand till it ferments. In some instances the fermentation is promoted and accelerated by the addition of leaven. This rye-paste is never given to the oxen till it becomes sour. At first they refuse it; but when they take to it, they prefer this acid food to any other. A large ox will eat in this manner about 22 lbs. of the paste a-day: it is given thrice a-day. The oil-cake of walnuts is also given to oxen in the Limosin, with the greatest success. In some parts of this district, boiled potatoes and chestnuts are given; in other parts, boiled maize rendered tender by pouring boiling water upon it.

In other parts of France, oxen are fed on leaves. This seems to have been an established custom in the time of Henry IV., as it is particularly mentioned by Oliver de Serres, who wrote, under the auspices of that monarch, the *Theatre d'Agriculture*. The practice was formerly usual in England also, in time of Henry VIII., and even so late as the reign of Charles II., as appears from Evelyn. The leaves used in France are principally those of the beech. They are gathered when on the point of falling, or immediately after they have fallen, and are preserved as dry as possible by being covered with straw. The management of this mode of keeping cattle is best understood in Franche Compté and Auvergne.

Where the Rhone divides between Tarascon and Arles, an island or delta is formed, called Camargue. This island is nearly an equilateral triangle of about seven leagues each way. It was formerly covered with wood, but has for a great many years been cleared, and covered with

rich pasture. Vast quantities of sheep and cattle are bred and fattened here. About 3000 horses are computed to be bred annually, with oxen and sheep in proportion. The oxen are reserved chiefly for the supply of the marine at Toulon. They differ in color from those generally met with in the rest of the kingdom, being a small black breed, not unlike Scotch cattle. They make excellent beef. They are very wild, and often very mischievous; so that when the droves of them go to Toulon, they are always preceded by a man on horseback, with a javelin in his hand, who keeps at a short distance ahead of them, to warn people of their approach.

The Norman cows, similar to those of Alderney, are the most celebrated for the quality of the milk they yield. This province, especially the neighborhood of Isigny in Lower Normandy, and Brittany, especially near Lanion, in the department of the north, and the Boulonnais, supply excellent butter, both fresh and salt. Gournay, a town in the department of the Loire, is particularly celebrated for its market of fine fresh butter, which is chiefly consumed in Paris. In the neighborhood of Marseilles, where cows are seldom seen, milk is furnished from sheep and goats: butter is only made from sheep's milk: a kind of curd is also made from this milk, which is called *beurre frais*: it is made into little pots, and brought about by the country people for sale. Cheese is very little made in France. Languedoc, Provence, Brittany, Normandy, Forez, and Bresse, furnish it in the greatest quantity. That of Brie is esteemed the best. On the borders of the Saone are a range of hills, which from their excessive fertility are called Monts d'Or. Several villages are dispersed over them, in which a very small delicate cream cheese is made. They are sent to very distant parts in little boxes, made exactly to the size of the cheese.

It is calculated that the number of oxen employed in husbandry are about 3,208,000; feeding oxen 404,500; young oxen, 1,456,000; cows, 1,016,000; making a total of 6,084,500.

The native breeds of sheep in France are, 1. The Picardy, hornless, white faces, and silky hanging ears; these are probably a bastard Flemish breed; their wool is coarse, and of middling length. 2. The Norman, with red legs and faces, and coarse wool. 3. The Berry, resembling somewhat the South Down sheep; the wool fine. 4. The Rousillon, similar to the Spanish, with very fine wool. 5. Near Mirepoix, in the department of the Upper Pyrenees, there is a sort of sheep, resembling the Norfolk breed, with horns, black faces and legs. The leading characteristics of the native French sheep are their long legs, thin carcasses, and coarse wool; the mutton in general is bad. The same characteristics prevail from north to south, except in the north the sheep are larger, stouter, and bear finer fleeces. These circumstances, however, principally arise from their being better managed in the north than in the south.

Louis XVI., in 1786, first established a flock of Merinos at Rambouillet. The produce, for some time, was given away. Recourse was then had to public sale. The sheep sold high, but the manufacturers did not give a proportionally high price for the wool. At this crisis, the revolution came on. There were at that period four principal establishments for Merinos, namely, those of Rambouillet, Alfert, Perpignan and Pompadour; but the revolution still farther depressed the demand for their wool. In 1811, Bonaparte published a decree, by which he intended and hoped to cover France with fine-woolled flocks; but, by this ill-advised measure, the final blow was given to the Merino breed. From that time they have been declining in France. In the exposé for the year 1814, it is asserted that Bonaparte's forced attempts to introduce the Merino breed of sheep, cost the government 200 millions of francs; and that, after all, so far from succeeding, the breeds of native sheep were rather deteriorated.

Sheep are kept in all parts of France, but principally in Rousillon, Languedoc, Provence, Dauphiny, Auvergne, Guienne, Gascony, Bearn, Marche, Limosin, Poitou, Maine, Anjou, Brittany, Tourraine, Champagne, Alsace, Franche Compté, Normandy and French Flanders. In most parts of France, the sheep are shut up in stables at night, and sheltered from the sun at noon, during the summer. They are generally folded in the fields till November. When the snow is deep, they are sometimes fed on the branches of trees. On the whole, the management of sheep is bad in France, especially in keeping them too hot during night in their houses, and too confined in their folds. The flocks are not large, seldom reaching 400.

On the mountains of the Cevennes, which run along the northern parts of the lower or eastern Languedoc, numerous flocks are fed in the summer on the aromatic herbs with which they abound. During the cold of the winter, they descend into the plains. But the most extensive and singular emigration of sheep is that which takes place annually, and as regularly as in Spain, from the Camargue, or Delta of the Rhone, and the desert of La Crau, to the mountains of Provence and Dauphiny, especially to the mountains of Gap and Barcelonetta, and back again. The migration to the mountains takes place in May, whence they return again in October or November, and sometimes earlier. The migration is not regulated by any other written laws, than some arrêts of the parliament to limit their roads to five toises of breadth. If they do any damage beyond that, it is paid for. The Barcelonetta mountains are the best, as they are covered with fine turf.

The emigration is conducted with all the order and regularity of the march of an army. The flocks belong to several proprietors, who reside principally about the Crau, at Arles, Salon, &c. M. Darluc, the author of the *Natural History of Provence*, as well as other writers, calculates the sheep kept in the Crau and the Camargue at one million. They travel in flocks of from 10,000 to 40,000, and are from twenty to thirty days on the journey. Among the shepherds that have the care of them, one is chosen as chief during the season. He regulates every thing relative to the march, and is treasurer for the company; all the money for the expenses of the route being lodged in his hands, and he paying for every thing. In order to check him, another of the company is appointed secretary. In his presence all payments are made, and he enters them immediately in his book. The rest of the shepherds form a council, whom the chief consults in case of any difficulty. To every thousand animals, three shepherds are

allowed, each of whom has his dog. In the centre of the flock, a number of asses march, carrying the provisions and baggage. The chief also takes his station in the centre: he issues the daily allowances of provisions, and transmits his orders, by his assistants, from this situation; and if any irregularity is committed, he is found there to receive the complaint. He also examines into any mischief which may be done by the flocks to the countries through which they pass, and pays the person who has received the injury: he next determines, whether it was occasioned by negligence or through accident: in the former case, the sum paid is levied on the offender; in the latter, it is taken from the common fund.

Besides the sheep there are always a number of goats which take the lead of the former. Some of the oldest he goats have bells round their necks. The discipline in which these are kept, and the intelligence which they display is remarkable. At the command of the shepherds, they either halt or proceed; and when the flocks rise in the morning, the moment these goats receive the order to proceed, they repair to their stations in the foremost ranks with great regularity. If they come to a stream, they halt, till the word of command is given, when they instantly plunge in and cross it, and are followed by the rest of the flock. When the flocks lie down at night, the shepherds and dogs still continue on the watch, relieving each other at stated intervals. When they arrive at the mountains, each shepherd has his particular district allotted him by the chief. The feed is hired at the rate of 20 sous each sheep for six months; and the price for the winter feed in the Crau and the Camargue, is the same. During the whole time of their stay on the mountains, the shepherds live almost entirely on bread and goat's milk, sleeping upon the ground in the open air.

The shepherds in France never inhabit a house: they go in the cottages in which their wives and families live, to take their meals, but sleep in their sheepfold, in huts made of reeds and clay, upon a mat spread on the ground: these huts are placed on wheels. The wages of shepherds are in general high; and they are a superior class of men, in all respects, to what they are in England. The wages of the chief shepherd are about 12*l.* sterling: besides this, he is allowed a certain sum, often three francs per head, for every sheep sold; his board at one and a half francs a day; and a cottage, rent free, for his family. The wages of the inferior shepherd is about 8*l.* sterling; and he has the same allowance for board as the chief shepherd.

The Pyrenees breed of shepherd dogs are particularly celebrated. They are black and white, of the size of a large wolf, a large head and neck, armed with collars, stuck with iron spikes, so that no wolf can attack them. But bears are more potent adversaries. If a bear can reach a tree, he is safe: he rises on his hind legs, with his back to the tree, and sets the dog at defiance. These dogs are fed entirely on bread and milk. In most parts of France, when it is necessary to catch a sheep, for the purpose of examining it, the shepherd orders his dog to drive the flock round his master, which he does by going round them in a circle, gradually decreasing, till the shepherd takes any one he wants.

The average weight of the fleeces of the native sheep of France is about 2½ or 3 libs.; that of the Merinos about 6 libs. The wool of the former, in general, is of an indifferent quality. The wool of Rousillon is the finest, that of Narbonne is nearly as fine, but more cottony, and of a shorter staple. The wool of Bezieres is next in quality; that of Pesenas, in Languedoc, on the side of Montagnac, is somewhat less fine. The wool of the sea-coast is heavy and coarse: the wools of the mountains of Montpellier and De Somieres are of three sorts; the first equal to the wool of Pesenas, the second less fine, the third very coarse. The wool of Berry is fine; that of Rheims inferior. The number of sheep in France is estimated at 30,307,728: the total of the wool they yield may be rated at 106,770,000 libs.

There are a vast number of goats in France, principally, of course, in the mountainous districts. Pigs are chiefly fed in the neighborhood of woods, or where grain abounds, as Normandy, Champagne, Limosin, &c. They are also fed on acorns; and, in the Limosin, on chestnuts.

Immense quantities of poultry are kept in all parts of France; to such an extent, indeed, that it is a question whether there is more weight of mutton consumed, or of poultry. They are of an excellent quality. Great pains are taken in rearing and fattening them. In French Flanders, as well as in other districts, they are fed with the flour of buckwheat, or rye, or potatoes: their food is frequently changed; and the vessel into which their meat is put is washed with hot water after every repast. After feeding, they are kept in darkness till the next meal. In some parts, what are called *vermiculaires* are expressly kept for them; that is, places in which worms for their food are collected and preserved. Capons are fattened in many parts of the kingdom: those which are fattened at Barbezieux, a town in the department of the Charente, are so much esteemed, that they are sent to Paris for those who keep the most delicate tables.

Narbonne honey is much celebrated, but it is not the produce of the neighborhood of that place; at least it is seldom to be procured there: what is so called is more commonly, as well as much more abundantly, procured at Perpignan. The beeswax of Champagne, Normandy, Sologne, Languedoc, Auvergne, and Brittany, is esteemed the best. Bleaching wax is a business of importance in France. The yellow wax of Brittany bleaches with the most ease, and becomes a beautiful white: it is principally bleached at Chateau Goutier, about eight leagues from Angers. By some, this is esteemed the very best in the kingdom; by others, that of Champagne is preferred. The wax of Amboise, and of Chaumont near Troyes, is of an inferior quality; and that made at Rouen is esteemed the worst, on account of the large quantity of suet they add to it. At Montpellier, there is a large manufacture of beeswax, and the process is conducted with great attention and skill.

The forests of France are numerous and extensive; and as they have also been of great importance, both on account of the fuel they supply, and of their application to other purposes, many calculations and conjectures have been made with respect to the surface which they cover. The Marquis de Mirabeau represents them as 30,000,-

000 arpents; in this opinion M. Malpart coincides. By the author of the *Credit National*, they are reckoned so low as 6,000,000 arpents. Mr. Young endeavors to determine this fact by two methods; by the maps of Cassini and by the consumption of the people. By the first method, he makes the extent of wood about 19,000,000 arpents, or one-seventh of the kingdom; by the other method, he finds, that the quantity of wood is about 20,800,000 arpents; the mean of the two results which he thus obtains is 19,850,515. We have already observed, however, that his estimate is too high, at least it is above that of the committee of the first national assembly, which reckons the wood only at 13,100,691 arpents. Mr. Young, in his calculation, reckons the annual value of the woods to be about 12 millions sterling, the rent being taken at 12*s*. per acre.

Some of the forests are very extensive, particularly those of Orleans, the Ardennes, and Fontainebleau. The forest of Orleans lies to the north of that city, and of the river Loire; it contains several plains and villages in it; its whole length is upwards of 15 leagues; but it is of unequal breadth, in some places seven or eight leagues, in others only two or three. It contains great variety of timber, such as oak, elm, aspens, fir, &c. Before the revolution the value of the timber annually felled in this forest amounted to 100,000 livres: the profit was part of the appanage of the Duke of Orleans. It was formerly infested by numerous troops of banditti; and it is still the haunt of immense numbers of wolves. The forest of Ardennes, in the time of Cæsar, was the largest in Gaul; it began on the banks of the Rhine, and extended to the very borders of the Rhone, that is to say, the diocess of Rheims in Champagne. In another place he says, it extended from the banks of the Rhine, and the country of Treves, to that of the Nevii, that is Hainault, Cambresis, and French Flanders, comprehending 50,000 paces in length. This forest has been cut down in a great many places, especially towards its extremeties: however, it still extends over the greater part of the Duchy of Luxembourg, in the southern part of the bishopric of Leige, and of the province of Hainault, and of the northern part of Champagne, though with several interruptions. It was formerly renowned for events of chivalry. The forest of Fontainebleau, anciently called the forest of Biere, contains 26,424 acres of ground, reckoning many empty places, where the trees have been cut down.

(*To be continued.*)

ESSAY ON THE NATURE AND IMPORTANCE OF AGRICULTURAL EDUCATION.

By Professor G. D. Armstrong, of Washington College, Va. To which the prize was awarded by the Bedford Agricultural Society.

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In this country, we use the phrase "agricultural education" with some variety of meaning. Very frequently, we apply it to the whole of that education which the farmer ought to receive; at other times, we use it in a more restricted sense, as including only that education which the farmer should receive for the especial purpose of preparing him for his business as a farmer, and not that which it is proper he should possess in common with men of all other professions. The latter is the more appropriate sense of the phrase, and is doubtless the sense in which the society intended it should be understood, and for these reasons I shall so understand it in the present essay. In taking such a course, I would by no means be understood as attaching but little value to that general education which the farmer should possess in common with others. In such a country as this, where the will of the people is the fountain of all power, it is of the greatest importance that all our citizens should be well informed respecting every subject on which they are called to act; and the more extensive and thorough this information is, the better will it be for them individually, and for our country too, "the common mother of us all." There is no remark more true, than that made by one of the fathers of our revolution, that the "permanence of our free institutions must depend, under Heaven, upon the intelligence and virtue of our people." But the discussion of such a topic, however appropriate it might be on another occasion, was, I suppose, intentionally excluded when agricultural education was proposed as the subject, and on this account I shall pass it by.

By agricultural education, I understand (as before remarked) that species of education, which the farmer should receive to prepare him for his business as a farmer; or, in other words, education in those departments of human knowledge which have an immediate and practical bearing upon the business of agriculture. In order to determine what studies would properly be embraced in such a course of instruction, we must look for a moment at the situation of the farmer. In this country, his situation is somewhat different from that which it is in most European countries, in those countries the land is generally owned by one class of men, whilst it is cultivated by another; —in this country, on the contrary, the land is generally owned and cultivated by the same person; so that in discussing this subject, with reference to our own condition, we must consider the farmer, both in the character of an owner, and in that of a cultivator of the soil.

The business of agriculture, when properly conducted, is one of a very complicated character. In no department of human labor, is attention directed to a greater variety of subjects, or subjects which it is more difficult fully to understand. The difficulties which attend the profitable prosecution of agriculture, are owing to such causes as these: differences in the constitution of soils; difference in the nature of plants considered with reference to the soil; the changeable character of plants themselves, improving as they do under one system of culture, and deteriorating under another; differences in the manner in which the produce of the soil may be prepared for market; differences in the manner in which the available force of the farm may be applied to the accomplishment of all necessary work. All these things, and many others of a similar character, are to be so attended to, and so conducted, that the greatest amount of net income shall be obtained, with most certainty, least labor and least detriment to the soil. Such is the problem which the farmer has to solve; and no one can examine the several particulars

embraced in it, and not be convinced that its solution is a matter of no common difficulty; or doubt that there is here a field opened, in which the best powers of the human mind, and the greatest amount of information which can possibly be brought to bear upon the subject, may most properly and most profitably be employed.

But to leave these general considerations, and to descend to particulars. What departments of human knowledge are there, which admit of an immediate and practical application to the business of the farmer? Answering this question, the first which claims attention is *chemistry*, or that branch of physical science which investigates the composition and intimate nature of bodies. This claims attention first on account of the manner as well as of the variety of the applications of which it admits.

It is certain that there are great differences among soils, in their adaptation to agricultural purposes. In one soil, it is necessary only to bury the seed, and almost without attention, it springs up, and in due season yields an abundant harvest; whilst in another, it is with the utmost difficulty we can obtain even a scanty return for our labors. There are great differences among soils, in their fitness for the cultivation of different crops. A soil which will yield an abundant harvest when cultivated in one crop, will not repay the expense of planting in another.—That these differences arise almost entirely from differences in the composition of soils, I suppose, no one doubts. A soil may be rendered unfit for the cultivation of a certain crop, either by a deficiency in some element necessary for its growth, or by containing some element which is positively injurious. In order that a farmer may go to work intelligently to remove the difficulty thus presented, he must first know whether the evil in question consists in the presence of some noxious substance, or in the absence of some necessary one; and then he must determine the precise nature of the substance to be removed or supplied. This he can seldom or never do, by mere inspection, for the simple reason, that the elements of soils are so intimately intermixed that it is impossible to distinguish them by the senses.

But let us suppose that the nature of the evil is known and that it consists in the presence of some noxious substance; is he then any better off? It is in vain to think of any mechanical means for its removal, for so intimately is it intermixed with the other constituents of the soil, that a resort to any such means must result in entire failure. In such circumstances a knowledge of chemical principles may be of the highest value, since from them, and from them alone can we learn, how the evil is to be removed. In Davy's Agricultural Chemistry, there is an instance mentioned, which will fully illustrate this point. "A soil of good apparent texture, from Lincolnshire, was put into my hands by Sir Joseph Banks, as remarkable for sterility. On examining it, I found that it contained sulphate of the oxide of iron, and I offered the obvious remedy of a top-dressing with lime, which converts the sulphate into a manure." In this case there are several things worthy of remark. 1st, the soil was, to all appearance, a good one, the cause of all its sterility being so intimately intermixed with the other constituents of the soil, as to be perfectly undistinguishable by the senses. 2nd, the sulphate of the oxide of iron was a substance of such a nature, and existed in such a form, as to render it altogether impossible to remove it by any other than chemical means;—as it was so intimately intermixed with the other elements of the soil as to be undistinguishable by the eye, any attempt to pick it out, would be entirely out of the question. 3d, by the application of chemical principles, Davy was enabled not only to detect the nature of the evil, but to convert it into a positive benefit. By the action of the lime spread upon the land, the sulphate of the oxide of iron was decomposed; the oxide of iron, a perfectly inert substance so far as vegetation was concerned, being left in the soil, whilst the sulphuric acid combined with the lime, thus forming sulphate of lime or plaster, a most excellent manure. 4th, the means by which Davy arrived at a knowledge of the nature of the evil, and the remedy to be applied, were exceedingly simple. It is true that these means are not mentioned in his accounts of the case; but all that was necessary, was to take a small portion of the soil, and having placed it in a glass, to pour some water over it, and then, after it had stood for a few minutes, to add a few drops of an infusion of nut-galls. When thus treated, the sulphate of the oxide of iron would discover itself, by the deep black color which it would give to the liquid. In such a case as this, the advantages resulting from a knowledge of chemistry must be apparent to every one.

In most instances, sterility arises from the absence of some one or more of the elements of a good soil, and it is to the interest of the farmer, by the application of a proper manure, to supply this deficiency. That it is not always the same element which is absent, is evident from the fact, that a manure which will prove very beneficial to one portion of land, will be entirely useless, and even in some instances, positively detrimental to another. Putrescent vegetable matter and common salt are two of the manures in common use in England. Some soils are unproductive for the very reason that they contain too much vegetable matter, and others are so because they contain too much salt. To apply vegetable matter to the first, or salt to the last, would be worse than useless; and yet it does not admit of question, that in most cases, each of these substances is a manure of great value. But I suppose that it is not necessary to urge the matter further. Every farmer knows, that there is no one manure which will act well on every kind of soil; and every one, I presume, will admit, that this difference arises almost entirely from differences in the composition of soils. If this be admitted, then the conclusion necessarily follows, that to apply manure to advantage to any soil, we must first know the particular nature of that soil; and this can be ascertained in no other way so well as by chemical analysis.

The most common objection which is made, when the claims of chemistry upon the practical agriculturist are urged, is based upon the complexity of chemical operations, and the difficulty of performing chemical analysis. In answer to this, I will say, that whilst it must be admitted that the accurate analysis of soils and minerals is a work of great difficulty, and such as none but the accomplished chemist, with a well furnished laboratory at command, can hope to perform, yet the difficulty is an imaginary and not a real one, as

far as the matter in hand is concerned. These accurate chemical analyses are seldom wanted for agricultural purposes; whilst such rough analyses as are needed, can be performed with but little labour, and but little apparatus. The remarks of Sir H. Davy on this point are:—"There is no idea more unfounded than that a great devotion of time, and a minute knowledge of general chemistry are necessary for pursuing experiments on the nature of soils, and the properties of manures. Nothing can be more easy than to discover whether a soil effervesces, or changes color by the action of an acid, or whether it burns when heated, or what weight it loses by heat; and yet these simple indications may be of great importance in a system of cultivation. The expense connected with chemical inquiries is extremely trifling; a small closet is sufficient for containing all the materials required. The most important experiments may be made by means of a small portable apparatus;—a few phials containing acids, alkalies, and chemical reagents; a lamp, a crucible, some filtering paper, some funnels and glasses for receiving products, are all that can be considered as absolutely essential for pursuing useful researches." The opinion of a man, who, like Davy, devoted his life to chemical studies, and no small portion of it to agricultural chemistry, and who of course was competent to express an opinion, should be received as decisive respecting this matter.

Intimately connected with chemistry, and bearing upon the same point, viz. the elucidation of the nature of soils, are the two intimately connected sciences of *mineralogy* and *geology*. Besides their direct application to agriculture, in this way, any one who will call to mind the large number of mineral substances which are useful to man, in almost all the various arts of life, must at once see the value of a knowledge of these sciences to the farmer, considered in the character of the owner of the soil. In speaking of the great value of mineral substances, it will be sufficient to mention, the various metallic ores; silex, used in the manufacture of glass; the different clays, used as pigments and in the manufacture of porcelain, earthenware and bricks; hydraulic and common limestone used in the preparation of cements, and the latter, so extensively and with such evident benefit applied as a manure; marble, and sulphate of lime, or plaster, salt and coal, the uses of which are familiar to every one. These constitute what is very properly termed the "mineral wealth" of a country, and have been scattered in such profusion by the hand of a bounteous Creator that no large portion of land can be found in any country, in which some of them do not exist. It is a fact, perhaps not generally known, that almost all minerals are definite compounds; that is, contain fixed and invariable portions of the elements of which they are composed; and that the different species of minerals can be distinguished from each other, by characteristics obvious at once to the senses, or else by such simple chemical tests as every one may command; so that to a person familiar with these characteristics, chemical analysis is very seldom requisite, to determine their exact composition. It is the object of the mineralogist to ascertain the obvious characteristics of each species of mineral, so that by a very simple examination, he may be enabled to recognize it.

Every year there is a great deal of labor fruitlessly expended, and a great deal of money thrown away, in different parts of our country, to which even a slight knowledge of mineralogy would give such a direction, as to make it profitable, instead of being, as it is, a complete loss to the community. I am acquainted with a case in which a copper mine was sold some years since for 50,000 dollars, and now the purchasers are prosecuting the sellers, on the ground of a fraud in the sale, the fraud alleged consisting in their having represented the mine as a valuable one, when in fact it was utterly worthless. From a personal examination of this mine, made at the request of a person who thought of becoming interested in it, I will venture to assert, that with a slight knowledge of mineralogy, all this waste of time and money, and character too, might have been saved. I am acquainted with a case in which, at this present time, a person is industriously engaged in digging up what he believes to be plaster, when by the simplest process in the world, he might be satisfied that there is not a particle of plaster in it. I know of an instance in which a gentleman expended a large part of his fortune, in making extensive preparations for working what he supposed to be a gold mine, when, in fact, it was nothing but sulphuret of iron or martial pyrites; and so simple an operation as heating a small fragment of it in the flame of a candle, would at once have made him aware of his mistake. In the first settlement of Virginia, a mistake respecting this same substance, by turning the attention of the colonists from their proper business, that of agriculture, caused great loss and great suffering to this then infant colony. But it is needless to multiply instances of this character. It is sufficient to refer to the great mineral riches which lie hidden in almost every part of our country; and to mention, that it is the object of mineralogy to enable us at once to recognize them by characteristics obvious to the senses, to show the value of such information to the possessor of the soil, and the propriety of including it in a course of agricultural education.

A third branch of natural science, which may very properly form a part of a course of agricultural education, is *botany*, including under this general name, both *systematic botany* and *vegetable physiology*. The object of *systematic botany* is, so to arrange and so to describe plants, we can at once determine with certainty both their names and their most important properties. In proposing such a study as this, I may be met with the question, why cannot the common names (as they are called) of plants be used by scientific writers, and thus the necessity for such a study be removed? There are several weighty reasons why such a course cannot be adopted. One is, that by far the greater part of the plants of every country have no common names; and even in the case of those which have, those names are entirely unknown to the greater part of the people. Another objection is, that the common names of plants are not uniform throughout the country; in many instances the same plant being called by different names, and what is still worse, different plants being called by the same name. To illustrate this objection, I will mention a single instance. In the "Details of experiments on Grasses," given in the appendix to Davy's Agricultural Chemistry,

there is a great amount of most valuable information respecting the comparative value of the different grasses; amongst others the *Phleum pratense* is mentioned, and the common name which it bears in England given, viz: Meadow cat's-tail grass. The only grass called cat's-tail grass in this country is a coarse grass, utterly worthless as food for cattle, and as different from the grass intended in the paper referred to as any two grasses can be. The *Phleum pratense* is the grass called timothy in some parts of the country, and herds-grass in others; for it is a fact of which all may not be aware, that the names timothy and herds-grass are applied interchangeably, in different parts of this country, to two very different grasses; that which is called timothy in one part, being called herds-grass in another, and that which is called herds-grass in the former is called timothy in the latter. In this case, dependence on the common name would necessarily have led the reader into error. In this paper the scientific names are given; but without a knowledge of systematic botany, it must remain a sealed book to any reader; and yet from a mere inspection of it any one can see that it contains the very kind of information respecting grasses which the farmer most needs. Should writers on agricultural subjects make use of common names, in very many instances their communications will be of no value out of the immediate section of country in which they reside; should they use the scientific names, it must be confessed, that at present the case would not be much better; but then the difficulty which here presents itself, is one which can be easily removed. Let farmers become familiar with these scientific names, and they then are in possession of the common language used by writers among every civilized people on earth.

The object of *vegetable physiology* is to explain the structure and vital action of plants. Plants may be regarded as a class of curious machines, by which the common elements of nature are worked up into organized forms, and thus fitted for the sustenance of human life. The object of vegetable physiology is to lay open their structure for inspection, and to explain their manner of operation. If plants were susceptible of no changes—did they remain the same, and thrive equally well in all climates, in all soils and under every system of cultivation—a full understanding of their structure and manner of growth would be of no practical value to the farmer. He would then receive a certain return for his labor and that return would be the same whatever course he might pursue. But such is not the fact. To be satisfied that great changes, and changes too which materially affect their value may be produced in plants, by careful cultivation, nothing more is necessary than to compare any four fine large species of apple, with the wild crab, the stock from which it originally sprang. Indeed, some of the plants in common cultivation have been so completely metamorphosed, have been so much improved by long continued and judicious culture, that it is impossible to tell with certainty what they originally were. That every plant will improve under a judicious system of culture, and deteriorate under an injudicious one, the fields of the thrifty and of the unthrifty farmer in every part of the country abundantly testify. Then, too, plants are subject to diseases, arising from the influence of the atmosphere, from the stings of insects and from many other causes. We all admit the importance of a knowledge of the anatomy and physiology of the human body to the physician; may we not fairly conclude, from analogy, that a similar knowledge, respecting plants, would be of service to the farmer?

Although plants are subject to many changes, from the influence of soils, climates, and the arts of men, yet these changes always take place in accordance with certain fixed and invariable laws. The object of the Vegetable Physiologist is, by careful observation and oft-repeated experiments, to learn these laws, in order that acting in accordance with them, man may render the vegetable kingdom subject to his control. Lord Bacon has remarked that "knowledge is power." This is true in a pecular manner of natural science, for it is only by acting in accordance with the laws of nature, that we can render it subservient to our will.

It may seem strange, but it is no more strange than true, that many of the commonly received opinions respecting the growth of plants, are directly at variance with truth; and as a matter of course, the practices based upon those opinions, are any thing else than the proper ones. To mention a single instance. It is the common belief that the sap circulates through the trunks of trees during the spring and summer, whilst it retires into the root during the winter; and as the dry-rot is believed to arise from the presence of sap in timber, the common practice is, to cut timber which it is desired shall last long in mid-winter. This opinion respecting the situation of the sap at different seasons of the year is altogether erroneous, as any one may convince himself by the following simple experiment. Let a young oak sapling be cut in the winter, and laid upon the fire. As soon as it becomes thoroughly heated, the steam will rush out at each end of the stick, from the heart wood, whilst the sap-wood will remain dry; let a similar stick be cut in the summer and treated in the same manner, the steam will then be found to issue from the sap-wood, whilst the heart-wood will remain dry; thus showing, that during the winter months, the heart-wood is the principal depository of the sap, whilst during the summer months, it circulates almost exclusively through the sap-wood. The common opinion, that the presence of sap is the immediate cause of the dry-rot in timber, is doubtless a correct one; but the very correctness of this opinion leads to an error in practice, when coupled with an incorrect opinion respecting the situation of the sap. The proper practice would be, to cut timber during the summer, and not during the winter months.

A fourth department of natural science, which may very properly be included in a course of agricultural education, is *mechanical philosophy*, embracing the laws of force and motion, as they apply in the case of solids, liquids, and gases. Mechanical philosophy has been defined as "that science which teaches us how to produce the greatest effect with the smallest expense of power." The principles of mechanics are involved in the construction of ploughs, wagons, thrashing machines, and in fact in all the implements of husbandry; and it is impossible that any one should fully understand the structure of these instruments, the

excellencies or defects of those now in use, or be able to decide intelligently upon the claims of new inventions, without a knowledge of these principles. Besides their useful applications in the business of agriculture, a knowledge of the principles of mechanics will be found of service in many of the operations of rural economy. I will mention an instance which occurred within my own knowledge. A farmer purchased a beef, agreeing to pay a certain price per pound net weight. Being unexpectedly called from home, he directed that during his absence, the beef should be killed, cut up, its weight ascertained, and that then it should be salted. When he returned, he found, on adding up the weight of the several quarters, that some mistake must have been made, as the sum was much more than it was possible the beef could weigh. On inquiring into the matter, he discovered that the weight belonging to one pair of steelyards had been used with another pair; the steelyards used being made for a 7lbs. weight, whilst the weight used was one of 5lbs. It was impossible to reweigh the beef, as it had been cut up, and packed away; so that the only alternative left him, was either to pay for beef which he had not received, or else to correct the error by calculation. The person in question was familiar with the mechanical principles of the lever, and by applying them to the case before him, easily ascertained the true weight of the beef. The condition of equilibrium in the case of the lever, is, that the weight multiplied into its distance from the fulcrum, shall equal the power multiplied into its distance from the fulcrum. From a consideration of this principle it will be seen, that the true weight was five-sevenths of the weight given by the 5 lbs. weight.

Another case, illustrating this same point, has come to my knowledge within a few months. A farmer undertook to have a forcing pump constructed, to raise water from a spring in a valley to his house, situated on a hill; the pump to be worked by water power. When every thing was completed, on attempting to make the pump work, he found that his power was insufficient. To remedy this evil, he had the whole taken to pieces, and every thing constructed anew and on a smaller scale, excepting the water power machinery. Had he been familiar with the principles of hydrostatics, he would have known that the same object might have been accomplished by simply replacing the piston of his pump, and of course the part of the log in which it worked, with one of smaller dimensions; whilst the remaining 200 feet of pipe for there was about that length of pipe between the pump and his house) might have remained the same, and in fact, the larger pipe would have answered better than the smaller one with which it was replaced, since the friction of the moving column of water would have been diminished by the interposition of a stratum of fluid between it and the sides of the pipe. Precisely such cases as these may not occur to a farmer in the whole course of his life, but unless his life be very different from that of most men, many cases will occur, in which a knowledge of mechanics will be equally useful; and on this account he should, if possible, render himself familiar with those principles.

A fifth study, which should be embraced in a course of agricultural education, is that of the more simple *mathematics*, including *arithmetic*, *algebra*, *geometry*, *trigonometry* and *surveying*.—One reason why these should be studied, is, that without a knowledge of them, it is impossible to pursue the study of mechanical philosophy or chemistry with any pleasure or to much advantage. Another, and the principal reason is, that they admit of an immediate and practical application to the business of agriculture. And here let me mention in particular, a thorough knowledge of the theory and use of numbers. If a farmer would know how his business is progressing, he must keep accounts and make many calculations. The following remarks of Mr. Hawkins, published in the British Quarterly Journal of Agriculture, and copied into the Farmers' Register for Oct. 1824, place this matter in its proper light: "In a business embracing so many particulars as agriculture, it in essential to be able to distinguish the profit and loss upon each. Nothing is more easy or more common, than for a man who keeps no accounts, to continue for a series of years to lose money on some particular department without knowing it; or, which is almost as bad, to employ his time and capital in less profitable speculations, when he might have applied them to such as were more so. A farmer grows many kinds of crops and keeps several species of animals—breeding some and buying others—and uses many kinds of manure. Assuming that he has a general profit of 10 per cent. at the end of the year, how is he to tell whether all the branches of his business have contributed rateably to this result, unless he keeps accounts? The cost of one acre of corn, for example, is compounded of rent, tithes, taxes, the cost of seed and tillage, horses' keep and man's keep, rates for the poor, the church and the highways;—and so with every other crop. Suppose now that in the case of his corn crop, all the items of expenditure accurately set down shall amount to £5 15s. per acre, and that the crop shall sell for £5 10s. Upon 40 acres, here would be a loss of £10 a year; but without setting down the several items which compose the cost, and adding them together, how is a man to tell within 5s. how much his acre of corn cost him? He may know that it cost him *about* £5 or £6, but in this very *about*, lies the essence of the mischief. If the selling price were £5 10s. the former supposition would give a profit and the latter a loss of £20 a year;—and thus any man may, and many men do, continue to the end of their lives, carrying on branches of business by which they lose money unconsciously. It is by a few shillings per acre, gained here and saved there, that a farmer makes his profits. It is no exaggerated estimate to suppose that these petty items may often make a difference of 10 per cent. at the year's end; and that so one man may make a living on the same farm where another would fail." These remarks will not apply in all their minutiæ, to the business of agriculture in this country; but in their general principles, they apply alike to the agriculture of every country; and they set before us, in its true light, the importance of a familiar acquaintance with figures, to the farmer. Many other illustrations might be given, but it is deemed unnecessary; for it is not by the endless multiplication of instances that the attention can be arrested or conviction produced, but by a few well-selected cases, which may properly be taken as illustrations of the whole.

Besides the studies already mentioned it would be desirable for the farmer to acquire, if possible, some knowledge of entomology, physics, meteorology and comparative anatomy. These studies are, it is true, comparatively unimportant; and yet a few remarks on their nature may not be inappropriate in this essay. Entomology is that science which treats of the structure and habits of insects. The farmer often suffers great injury from the depredations of insects, and no certain way of protecting himself against them can be discovered (unless it be by accident) without first becoming acquainted with their nature and habits. The mistakes to which persons are liable, from the want of such information, are well illustrated in the following extract from a treatise on entomology by Messrs. Kirby and Spence. "In Germany, the gardeners and country people, with great industry, gather whole baskets-full of destructive cabbage-moth, and then bury them, which is just as wise a course as to attempt to kill a crab by covering it with water; for many of them being fully grown, and ready to pass into their next state, which they do under the ground, instead of destroying them by this manœuvre, their appearance again the following year in greater numbers is actually facilitated. Yet this plan, if applied to our common cabbage-caterpillar, which does not go under ground, would succeed." Physics, in its restricted sense, (and it is in that sense that I here use it,) embraces an inquiry into the nature of light, heat, electricity and magnetism. An acquaintance with the laws which govern these ever-active and every-where present agents, might prove serviceable to the farmer in many cases; as, in the construction of ice-houses, fire-places, lightning-rods, the selection and preparation of clothing materials, &c. The object of meteorology is to inquire into the nature of the atmosphere, and of those phenomena which occur in the atmosphere, or are caused by it, such as the formation of clouds, the production of rain, hail and snow, the deposition of dew and frost, the cause of winds, &c. The object of comparative anatomy is to explain the structure of animals; more particularly the forms of their different bones, the manner in which those bones are connected, the position and attachment of the muscles, &c. A knowledge of the structure of what are termed domestic animals, would, in all probability, admit of some valuable applications in the hands of practical men.

Whilst thus advocating the claims of science, I would by no means be understood as advancing the opinion, that a scientific education alone would fit a man for the profitable prosecution of agriculture; for this is an opinion which I do not entertain. I would make the farmer's scientific education, like education of every other kind, preparatory to a course of practical training to be received from some farmer competent to the task. Sir H. Davy's remark respecting agricultural chemistry, is a very just one, and might be made with equal truth of every other science: "It has been said, and undoubtedly with great truth, that a philosophical chemist would most probably make a very unprofitable business of farming; and this certainly would be the case, if he were a mere philosophical chemist, and unless he was acquainted with the practice of the art as well as its theory. But there is reason to believe that he would be a more successful agriculturist, than one equally initiated in farming, but ignorant of chemistry; his science, so far as it went, would be useful to him." The case of Lavoisier, one of the most celebrated of European chemists affords an example of the advantages which may be derived from the application of science to agriculture. By following a system of cultivation, based upon his knowledge of natural science, he is said, "in the course of nine years, to have doubled the quantity of grain produced on his farm, and to have quintupled the number of his flocks." With such an example before us, we cannot reasonably call in question the value of scientific knowledge to the farmer; but at the same time, let me remark, that should we suppose that scientific knowledge was all that was needed, we should fall into an error equally great. There are a thousand important considerations connected with farming, of which science does not and cannot take cognizance, and which can be learned from the practical farmer alone. If little has been said in the present essay, respecting the importance of such knowledge, it has not been because the author undervalued it, but because he supposed it was not properly embraced under the term education, as that term is generally understood in this country, and at this day.

Such are the principal studies which should be embraced in a course of agricultural education. It will be noticed that they are all of a scientific character; and here a remark or two respecting the nature of science may not be misplaced, with especial reference to the objection commonly made against it, based upon the belief that scientific knowledge is something essentially different from human knowledge in general. By science, when properly understood, nothing more nor less is meant than our knowledge arranged and generalized. Our knowledge on all subjects is in the first instance a knowledge of individual facts. After a stock of facts has accumulated, we perceive that many of them are of the same character; these we class together, and include them under a general statement. Again, we observe that some of these facts bear to others the relation of cause to effect, and we arrange them in accordance with this observation. This once accomplished, our knowledge has become science. By this process, the form and not the nature of our knowledge is changed. Founded, as scientific principles are, upon observation, their application to the affairs of life is one of the very best methods of testing their truth. If they will not stand this test, they form no part of true science, but of "science falsely so called."

The greatest objection in the minds of most persons to the scientific education of farmers, is that it will make them mere theorists. But will ignorance of science prevent their theorizing? The remarks of Hawkins in a communication already referred to, are; "Ignorant men are the most irreclaimable theorists. They attribute effects to the most fanciful causes, and then from their assumed and absurd premises, they argue away as boldly as a geometrician. I have heard many striking instances of this from a friend of mine, who is both a physician and a philosopher. One instance was as follows. A poor fellow was troubled with what he considered "a rising of the lights;"—and when I asked him, if he had taken

any thing for it, replied, that "he had swallowed a few shot to keep them down." The position assumed by Mr. Hawkins in the above extract, that "ignorant men are the most irreclaimable theorists," may perhaps seem to some a very bold position; and yet I will venture to assert that a careful observation of the facts of the case will fully confirm its correctness—at any rate, such is the result of my observation. The truth is, the human mind is so constituted, that it is impossible for a person to become acquainted with any large number of facts, and not reason upon them, and form some theory respecting them; and, if ignorant of any of the data on which such reasoning should be based, or of the correct principles of theorizing, he will almost inevitably run into error. An acquaintance with true science, so far from leading a man into a course of unprofitable theorizing, would be the very best means of preserving him from such a course.

Such a scientific course as that which has been proposed, would require for its completion, in the case of a young man already familiar with the ordinary branches of an English education, about two years; or, with very close application, perhaps a somewhat shorter period might suffice. The study of the sciences should be commenced in youth; for few men can be brought to give that close attention which is necessary for the successful prosecution of such studies, after their proper school-days are over. But "in the morning of our days, when the senses are unworn and tender, and the gloss of novelty is fresh on all the objects which surround us;" when the memory is susceptible of its most lasting impressions, and the curiosity is all life; a taste for such studies can be planted, and those habits of minute and careful observation, so essential in scientific pursuits, can be formed. At this period the father must in all cases think and act for his son. Does he desire to leave him beyond the reach of poverty and want? It should be a question for serious consideration, whether he can best secure this end, by adding a few hundred dollars to his patrimony, or by expending that money in giving him an education, which will fit him fully for his intended business, and which will be to him a source of pleasure, as well as profit, to the end of his days.

At this time it is generally admitted, that the agriculture of Virginia needs a change for the better. That it is not what it should be; we need no other evidence than that afforded by the fact, that many of our most valuable, most enterprising young men, are leaving the land of their fathers, to seek a home, and perhaps many of them a grave, in the far distant regions of the west and southwest.—Within a short time, a spirit of improvement has sprung up, which seems to be gaining strength, and extending its influence year by year. What is now needed is something to give to this spirit a right direction; and this is the very thing which agricultural education will accomplish, if it accomplish any thing. If this can be done, we may confidently indulge the hope that Virginia will yet recover her proud pre-eminence among her sister states; that her now half-deserted districts will again be filled with a contented population; that her most impoverished soils will be restored to more than their ancient fertility, and will again wave with the golden harvest; that her sons, instead of turning their footsteps to some distant land, will remain at home, and, proud of their birth-place, will close their days "within sight of the very spot where they were born."

ON THE DIFFERENT PROPOSED SCHEMES OF ROTATIONS.

To the Editor of the Farmers' Register.

Carysbrook, May 12th, 1840.

One of those lucky mischances which sometimes occur to the way-faring man has brought me to-day, *nolens volens*, to this place: a place which has been rendered not quite so noted in your journal by the essays of its worthy proprietor, as was Carysbrook of England by the temporary occupancy of the unfortunate Charles, who, if I remember aright, took refuge there from the pursuit of the commonwealth's men. How are the apparent errors of short-sighted mortals turned to good account by a kind Providence! I deplored missing my way as a great evil; but what a treat was in store for me, in the sight of this interesting spot! Still more I lamented my fate when I found the landlord was from home! But you and your readers are the gainers by my ill luck, insomuch as it has produced this *valuable* communication. Nor is it a total loss with me; for the absence of the host has been the means of bringing out in finer relief the shining merit of his representative, a personage bearing the name of the immortal author of the Declaration of Independence, who in his sphere, (the department of butler,) is no less perfect than was his great namesake in the cabinet; and to whom, if Pope said true, equal honor is due:

"Act well your part, there *all* the honor lies."

Casting my eye around the hall in which I now sit, where are to be seen the appliances of hunting and fishing, it fell upon some of the numbers of your Register, which, among other appropriate periodicals, are scattered in careless literary confusion about the room. In the March number I found an essay on "the five-field rotation and grazing;" this referred to other communications on the same subject in the February number.

Now, Mr. Editor, my success in the discussion of Jefferson's eatables, has not inspired me with the vanity to pretend to discuss farming matters with these gentlemen. It is true I am a sort of a farmer in an humble way. Having failed at one of the *learned* professions, I betook myself to my present occupation, as a make-shift, hoping that if I failed here too, my errors would be more apt to escape observation.

The first thing that struck my attention in the above mentioned essays was the remarkably civil, complimentary style of your tip-top farmers to each other. I like it much. It is so different from that gasconading, insulting mode of writing practised by politicians; and not in writing only, but in debating too. I trust the new code of honor which authorizes one man to give another the lie, or charge him with dishonesty, and then to avoid responsibility by averring that he means a political lie, or political dishonesty, will never find acceptance among the agricultural community. Among us, let there be no nice distinction between an agricultural lie and any other.

But to the point. With all due deference, permit me to state an objection to each of the systems of rotation proposed. To Mr. Carter's, because it seems to be bottomed upon the presumption that the land has become too rich already, and requires depletion, an effect which, it strikes me, the three successive grain crops are well calculated to promote. To Mr. Braxton's, because it leaves the land naked and perfectly idle through one winter, and of course losing ground. I have always thought a spring crop after corn inadmissible for that reason. Besides that, grass sown on oats in the spring of the year is extremely liable to perish under the influence of the summer's sun. To Rivanna's, because without the common, or sixth field, it differs but little from the exploded three-field, or make-shift system. It is true he considers this common *important* to all rotations; but to his it seems indispensable, for where else are your cattle to find sustenance till the 20th June, the day set for the feast? Before that day comes they will have feasted the buzzards. And even with the aid of the common, or "short-bite," (by the way, if it is a "short-bite" in the Green Spring country, what can be expected from a common in "old Flu," or some other places I could name?) they would exhibit in their "unfed sides" demonstration strong against the system; they would sing, in very doleful tones indeed, the old song,

"'Twas on the 21st of June,
In charming summer weather."

Give the three-field shift the advantage of a common, and where is the difference? No other than one field of clover instead of two, covering a somewhat smaller portion of your farm, one-third being less than two-fifths. I am of Mr. C's opinion, that under Rivanna's system the clover has not imparted to the land all its benefit, before it is refallowed. It ought to be an object in a judicious and economical course of husbandry to obtain hay and seed from a clover crop, or at least a part of it. If then one of the two fields is mowed and seed gathered from it, it cannot be grazed at all the same year. Only one field therefore is left for grazing, and that between the 20th June and fallowing time—a very "short-bite" indeed. It appears to me there should be two clover years in succession—cutting the first if the crop will bear the scythe, and grazing the second—and two grain years only in succession, which is a four-field course; and if I am allowed the common in the bargain, this is a valuable auxiliary, to enable the pasture field to get a little ahead in the spring, before the stock is put on.

The long and short of the matter is, that systems for all things must be controlled by circumstances. A system of mental improvement must be adapted to the capacity of the particular mind, so must be a system of agriculture to the qualities of the soil, general condition, and localities of the particular farm. Rivanna, for example, or the author, enjoys the advantage of a very fine meadow, and abundant crops of corn, with a plenty of wheat straw, &c. which afford no small help to the "short-bite." By the way, in passing through the front gate, I observed some horses standing with their chins resting on the fence, looking with longing eyes into the adjoining clover field, and seeming to pray for the advent of the 20th June; and some hogs peering, with optics sharp, through the rails.

In conclusion of these very *erudite* remarks, permit me to say that the present condition of this splendid farm furnishes a refutation of all objection to the management of it. The science of agriculture is here beautifully illustrated, whilst its profits are largely realized.

"A TRAVELLER."

HOT AIR FURNACES.

From the Cultivator.

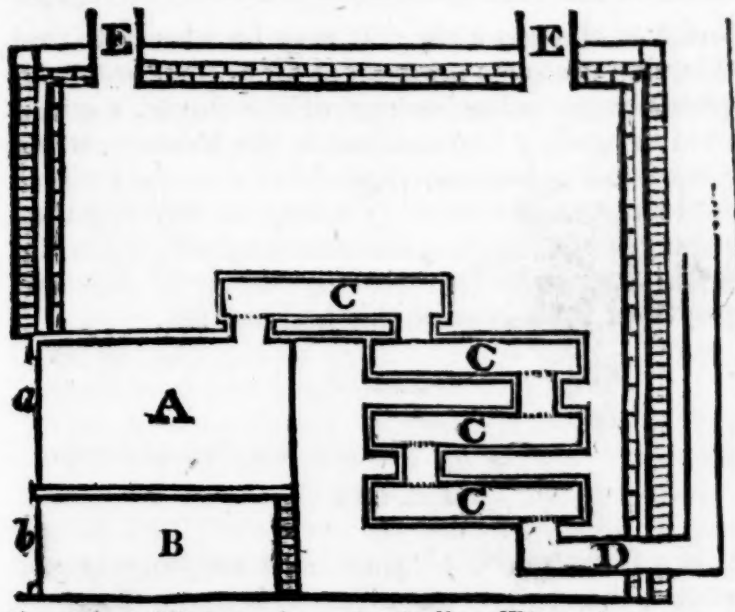
I have repeatedly been asked for information respecting hot air furnaces, and as summer is the time for their erection, perhaps a short description will not be unacceptable.

Permit me to speak very briefly of their advantages, alluding of course to the mode of construction here described. Fuel is a large item of expense in every family, and is becoming still more so. We know many farmers who annually consume, in warming the different rooms of their houses, as many as fifty cords of wood, and some much more. We cannot alter the quantity of heat which a given quantity of fuel throws off in combustion, without altering its nature; but we can adopt means to *save* this heat and apply it to warming our rooms. Experiments have shown that by the use of a common brick fire-place, the owner pays *nine-tenths* of the cost of the fuel for the privilege of heating the air above the top of his chimney. The hot-air furnace is the best thing, by far, that we have seen, for saving fuel. A neighbor has kept several rooms of his house warm night and day, through the past winter, by means of one, and from his experiments it is clear that it will not require *ten cords* of wood for the whole year.

Another important advantage is keeping up only one fire for several rooms. As the wood is burned large, it saves much labor in cutting, and needs replenishing once only in five or six hours. Another advantage is the house-room saved, none being occupied by stoves or fire-places. Another is the prevention of dirt, the universal accompaniment of fire-places. It also renders all the rooms warm in the house, by night as well as by day, imparting to them the peculiar and comfortable warmth of the air of summer. It is safe—children do not burn their fingers, and if rightly constructed, the house is far less liable to take fire. And by no means a small consideration to the person who loves the *culture of flowers*, and who cannot afford the expense and care of a green-house, tender plants may be kept in any of the rooms, without the least danger of their being frosted, and with no other attention than that of watering.

The hot air furnaces commonly erected in cities are on an entirely different plan, and, in my opinion, greatly inferior. The one here described is the result of many experiments, and is the best form of several which have been tried. It was designed by William R. Smith, of Macedon.

A, is a longitudinal section of the stove, for the reception of fuel. It should be large to admit large sticks of wood, so as to lessen the labor of cutting, and to cause the fire to burn long without renewing. Three feet in length is not too much. The bottom, instead of being a plate, is a grating, made of cast iron bars, running lengthwise with the stove, supported at the ends and in the middle by cross bars. Through this grating



the ashes fall into the ash-pit B. The advantages of this are, the wood burns more freely, the fire need not be interrupted to remove the ashes, and the ashes are much better in quality, as they contain no mixture of charcoal. The doors, *a* and *b*, of the stove and ash-pit, should, if practicable, shut very closely for the better regulation of the draft, as the fuel will burn slowly for a long time when desired, as, for instance, during night and in mild weather, when the draft is nearly closed. All the air admitted to the fuel, should be through the ash-pit door.

C, C, C, C, are four flat, square, cast iron drums, connected by short cast iron pipes, and through which the smoke passes to the smoke pipe D, from which it escapes into the chimney, or passes out into the open air. As the smoke thus becomes much cooled before entering the pipe D, the soot accumulates more rapidly, and hence this pipe should be as short as practicable. It should however, have some height to cause draft, or should enter a tight small chimney, for the same purpose. The drums should have small openings for cleaning. They are supported by bricks not shown in the figure, to prevent confusion.

At a short distance from this apparatus, a double brick wall, with an included plate of air, is built round the whole. It is covered by a layer of bricks, supported by iron bars, and on this a layer of four or five inches of ashes, covered again by brick, mortar or boards.

It will be observed that the greatest part of the heat of the burning fuel is thrown out from the drums, and heats the surrounding air; this heated air is confined within the brick air chamber, and it escapes through the air pipes, E, E, into the rooms above. The object of the double walls, is the more perfectly to confine the heat, and to prevent its escape through any other channel. Probably, if the included space between the walls, were several inches in thickness, and filled with dry ashes, or still better, with powdered charcoal, this would be more completely attained. If the inner wall is occasionally braced by a cross brick to the outer, it need be only two inches in thickness or composed of bricks on edge.

The furnace should be built in a room in the cellar entirely devoted to the purpose, and a window left open for the admission of fresh air to the chamber; or if this cannot be done, a trunk or pipe one foot square, should lead from without through the wall to the chamber. In the former case, several air holes, four inches square or more, should be made at the bottom of the chamber.

On one side of the chamber, should be two double sheet-iron doors, for admission in cleaning the drums, &c. and sufficient space for this purpose should be allowed between the drums and the walls.

The pipes E, E, through which the hot air escapes to the rooms above, should be of bright tin, and as nearly vertical as possible, and from eight to twelve inches in diameter. The larger they are, the less the temperature of the air chamber need be raised to heat the rooms above, consequently less fuel is required, and the cast iron will not burn out so soon.

In the seventh volume of the Genesee Farmer is a description of a furnace somewhat similar; but the drums are there placed in succession *above* the stove. In the present plan, the descent of the smoke causes it to throw out its heat more completely; and as the last drum is the lowest, the coldest and freshest air comes in contact with it, and the smoke passes off at a lower temperature than that of the air in the upper part of the chamber. But great care is necessary to have the drums tight, to prevent the escape of smoke into the chamber, and for this purpose the cracks at the joints should be stopped with a paste made of iron filings or turnings mixed with sal ammoniac and water.

The expense may be diminished by substituting sheet iron for cast iron for the two last drums.

Circular brass or iron grates, turning on the centre, placed in the floor of the room, over the air pipes, E, E, regulate the quantity of hot air admitted.

This method of warming houses has been found preferable in point of *health* and comfort to any other; and the only objection appears to be, we do not have the cheerful "blazing hearth" to gaze at. But habit, which created our desire for this, will soon remove the difficulty, and most will learn to prefer a book, a picture and a stand of fine flowers in winter, to blazing sticks, smoke and a heap of ashes.

Should any one wish further information, I would communicate it with pleasure, through the columns of the Cultivator. Very respectfully,

Macedon 3 *mo.* 1840. J. J. THOMAS.

From the Journal of the American Silk Society.

THE GRAPE VINE.

There are few things that afford more pleasure for the expense of time and trouble than a good and well-managed grape vine. From considerable observation the editor of this Journal was led to conclude, that a very erroneous practice was generally pursued in relation to grape vines; and three years ago determined to try an experiment. The error in practice alluded to is this: the vine is permitted to grow to the full extent of its ability, and thus every season a large portion of wood has to be cut off and thrown away. It occurred to the writer that this waste of the power of the plant might and ought to be prevented. Accordingly in the spring of 1837, he obtained an Isabella vine, one year old from the layer, having a very good root, and planted it in an ordinary soil, of rather a sandy quality, putting a wheel-barrow load of wood-yard manure and old lime mortar about

the root. As soon as it began to grow he rubbed off all the buds but one, and trained that perpendicularly, rubbing off during the season all side shoots; and when it had reached to the top of a second story balcony nipped the end off, thus stopping its further growth. In the spring of 1838, he rubbed off every bud but two at the top of the vine, and trained these two along the front of the balcony, having stretched a large wire along the posts for their support. He rubbed off every side bud during the season, as at first. Both shoots made about thirty-five feet of growth this season. In the spring of 1839, every joint on the horizontal shoots was permitted to send forth its buds, and to grow unmolested, till the branches had fairly set fruit, generally until they were about 18 inches long. Then the end of each branch was nipped off, and its further growth prevented. The perpendicular stem was carefully prevented from sending out buds. The whole plant was carefully watched that no more buds might be permitted to grow—each one being rubbed off as soon as it appeared. Thus, from about the middle of June, the vine was not permitted to form any new wood. During the season the grapes grew uncommonly well, and every one ripened in good season, and was very fine, as was proved by the numerous company at the Horticultural Society exhibition, who unanimously pronounced them the finest grapes there. The produce of this vine was *three hundred and fifteen bunches*, all very large, and the berries of uncommon size. The society awarded to them its first premium for native grapes. Almost every body, however, doubted whether the plant had not been injured by this excessive bearing of fruit; and many old gardeners considered that it would be killed by it. The writer never doubted on this score. He had only compelled the plant to *make fruit*, instead of wood to be cut off and thrown away, and has no doubt that if he had been able to get the season before a greater length of wood for fruit branches, the plant would have supported a much larger quantity of fruit. On trimming the vine preparatory to its bearing in 1840, there was very little wood to be cut off. Only two buds were left on each branch of last year's growth, and these are now growing and showing fruit buds very finely. The vine is not dead, nor does it appear to have been injured in the least by last year's hard work. So far, the experiment is beautifully successful, and we now feel authorized to recommend this plan to all who love fine fruit. It must be borne in mind that the experiment was made with the Isabella grape; we of course cannot say any thing about its applicability to other kinds from *experience;* but the same reasoning applies with equal force to all kinds. If the powers of a plant can be turned from the formation of wood to that of making fruit, as we have proved it can in the case of the Isabella grape, we do not see any reason why the experiment may not be successful with all kinds of grapes and fruit. One thing we do know, that a plant that bears fruit does not grow as much as one that does not; and we are hence authorized to infer, that the power of the plant may be directed at pleasure, either to the growth of fruit or of wood—that by suppressing the one, you may increase the other, to a very great extent. The vine above described has attracted the attention of numerous persons, and many have determined to follow the example. It may be observed that this vine occupies no room at all in the garden. It grows close in the corner of the house, a single stem ascending fourteen feet to the balcony, when it starts off horizontally, as above described, along the balcony. Thus every house in any city that has a yard at all, so that the vine may be set in the earth, may have just such a supply of delicious grapes as the writer of this had last fall.

G. B. S.

From the New England Farmer.

POULTRY.

We have much pleasure in presenting to our readers the reply of our friend Hunt to the queries put to him a few weeks since in the N. E. Farmer. They are full and satisfactory. We should be glad to hear again from our correspondent at Roxbury, who can, no doubt, if he will, give us some valuable suggestion from his experience. We published in our last the amount of eggs exported from Westport to New York market. The number of eggs and the amount received for them were enormous, and show that "many littles make a mickle."

"The capital invested in poultry and rabbits in Great Britain is estimated at £10,000,000 sterling." "When we look," says McQueen, "at the immense number of eggs brought from Ireland, (50 tons of eggs and 10 tons of live and dead poultry have been shipped from Dublin in one day,) and 66,000,000 eggs imported from France for London alone; and this immense number a trifle certainly to what are produced in this country, we shall cease to wonder at the large capital here stated to be invested in poultry of all kinds. The quantity of eggs imported into Liverpool from Ireland in 1832, was 4097 crates, value £81,940 sterling; which at 6d. per doz. gives 3,277,600 dozens, and the number 39,331,200. In 1833, the import had increased to 7,851 crates, or upwards of 70,000,000. The number imported into Glasgow from Ireland in 1835, by the custom house entries, was 19,321 crates, which at nine eggs to a pound, gives the number, 17,459,568.

The production and consumption of poultry, game, &c. in Great Britain and Ireland, may be judged of by the consumption of Paris, in 1822, of the following articles and animals, according to Count Chalson—931,000 pigeons, 1,289,000 chickens, 549,000 turkeys, 328,000 geese, 131,000 partridges, 177,000 rabbits, 174,000 ducks."

This shows the magnitude of an interest which is deemed by most farmers of too trifling consideration to be worth making any calculation about.

It is, without doubt, a proportionately great interest in this country, yet who in this aspect deems it worth attending to.

As to our good friend Hunt's pertinacity about his personal beauty, it will be seen that he struts about and crows as loud as any old rooster. Now we shall not dispute the point any farther with him, but quit the yard; and, as most people do who hear him, we agree to "sign." H. C.

Wyoming, Penn., April 20, 1840.

Dear sir.—In reply to the inquiries in your paper of the 8th inst., I answer—

1. There is but one way to keep your roosters separate, and that is to have separate yards for them. A yard five feet by ten is large enough for a rooster and twelve hens.

2. I give my hens flesh raw or cooked, just as is convenient. When I could obtain it, I gave the liver, &c., of any animal, cut up into small pieces. One sheep pluck I found sufficient for nineteen hens and two roosters for seven days. Fat pork, boiled or raw, always sets the hen a singing—a sure precursory of laying.

3. A temperature of about *temperate* is best. This is generally obtained by a tight room with glass windows. I am satisfied, however, that a small stove, in severe weather, would be of great service. I am preparing a house thus furnished.

4. Young chickens for the first week require a temperature of from 75 to 80 deg. Far., and at night always about 80 deg. This last may be obtained after the chickens are over a week old, by a tight box, with a hole in one end, at the bottom. The heat of the bodies of the chickens will soon raise the temperature to the right degree. I observe here, that I found my opinion as to the degree requisite for young chickens, on actual experiment with the thermometer and the old hen, following nature as my guide; she is generally right.

5. I raised one hundred and fifty chickens in a room twenty-five feet long and seven feet wide: two feet high in front, and four feet high in rear. The roof was covered tight for the space of four feet, the remaining three feet and the front of the room was covered with stats just far enough apart to keep the chickens from getting out. The chickens were put into this, having a southern exposure, after they were about two weeks old, and kept there until they were well fledged. The tight box of course placed in the oven for them to sleep in. The three-feet slat covering I had made so that I could remove it, to get into the room if necessary. A pan for water and for food, with the sleeping box, furnishes the room.

6. If you put one old hen in, she will kill all the chickens except her own.

7. Answered in 5.

8. You may take the young chickens as soon as they are a day old from the hen. It is best, however, to let them remain a day or two.

9. Answered in 5.

10. I gave my hens raw carrots. They would not eat them. They are fond of raw turnips cut up; also of ruta baga. I suppose that any food they will eat is good for them.

11. The moulting varies. Hens in good condition moult in a shorter time than those which are poorer.

12. I have not been able to ascertain "the habitat" of the Creole. They are white with black spots all over, except the neck, which is perfectly white. Their tails are more fan-like or displayed during laying time, and their rumps present a fuller or more elevated appearance than other chickens'. The ends of the tail feathers are generally blackish. They can be obtained about Philadelphia. The purest kind can be obtained in Buckingham, Bucks county, Pennsylvania. My good friend, William H. Johnson, of that place, will cheerfully direct to such persons as have them. They are capital layers--poor setters.

13. Judge Burr, of Vincent Town, New Jersey, has the Booby hen, and the finest collection of poultry I have seen any where.—The long Bucks county hens weighing so much, are Malays. They are not good layers,and their eggs are very apt to have two yolks; of course do not hatch well. With respect,

THOS. P. HUNT.

N. B.—You are wrongly informed as to my teaching my children to believe me to be "the handsomest man," &c. I was not under that necessity. They believed it by *intuition*—and I insist upon it that that which is intuitively true, cannot be *demonstratively* false. Of course, I am not content to admit, then, that your judgment is infallibly correct. All that I can admit is, *your* judgment is sincere; but my *children* say they have never seen a man as handsome as I am, nor do they believe that *you* have.

REMARKS ON THE PROPRIETY OF USING MARL IN SOUTH CAROLINA.

[From the Carolina Planter.

Mr. Editor.—So far as I have seen or heard, all those who are anxious for a geological survey of the state, seem really and practically to have but one object, viz. the discovery of marl. Without intending to discuss the propriety of calling this hunt after marl, a geological survey, or whether it would not be cheaper and every way more expedient for the state—if she must do something—to appoint some one skilled in the art of finding and using marl, to search for that alone, or if you please, for that and other calcareous manures, permit me to ask a few questions of you or some of your correspondents acquainted with the subject, I do not ask them idly. I happen to live in the neighborhood of an exhaustible bed of shells, and, as we suppose, marl also, with which at a moderate expense I could cover my whole possessions. I wish, however, to know from some authentic source, how I am to proceed, and *what I am to gain by it*, before I venture. Will you do me the favor to inform me, then, what marl is. How many kinds there are? What are the tests of each? In what condition it is generally found, and to what condition it must be brought before it can be employed as a manure? The simplest and cheapest manner of preparing it? What quantity should be put on the ground per acre? The best manner of doing it? And, most of all, how much it will increase the produce per acre? And how long it will last? Satisfactory answers to these questions have probably been given again and again, but they are unknown to me, and to most of your readers probably. I do not take Mr. Ruffin's work, it is too far north for me. If the matter has been fully treated there, could not you or some of your correspondents collect and condense what he has said, and make an application of it to our soil and to our staple? My land is in general light and sandy. Your excellent remark, that liming such land, was like giving "bitters without beef steak," confirms an opinion I have always entertained. And I am afraid marl will act in the same way. Before I try the experiment I should be glad if possible to know something certain about it.

MIDDLE COUNTRY.

[We are the more pleased to learn from the

above article, (inasmuch as it proceeds from one who seems to esteem marling very lightly,) that there has been already excited in South Carolina so much interest in regard to marl, and so much anxiety to discover its existence. We agree with the writer in *one* at least of his positions; that is, that a geological survey is not necessary to discover the existence, or to fix the value, of marl beds. And though in a recent address, delivered before a southern agricultural society, the discovery and appreciation of marl, and the consequent great value added to the poor lands of lower Virginia, have been ascribed to the *geological survey* of this state, we make bold here to assert that the geological survey had no more agency in producing this improvement than it had in exciting the Seminole war.* And, indeed, if it has produced any good effects to the general and agricultural interests of Virginia, of as much worth as the marling of even 100 acres of poor land, we confess that we are unacquainted with all such results.

The interest excited in regard to marl and marling in South Carolina must lead to the proper use of the great resources for agricultural improvement and wealth, which have been heretofore, or until very recently, entirely neglected there. And even if those most interested in the matter continue to refuse to receive information from any experienced source, merely because it comes from a distance, the zeal and intelligent observation of new beginners in South Carolina will ultimately arrrive at experience and truth, though through all the disadvantages and all the losses that must attend an untaught and unaided apprenticeship in this new business. We could assure this writer, (if he could ever hear any thing uttered so "far north,") that although the person he names succeeded in quadrupling the income and value of his land by the application of marl, yet, while so laboring, untaught by books, and unaided by experience, that he encountered losses from his ignorance which were more than enough to have paid for as extensive and profitable improvements as he made; and that the lights of experience now published, and which then had no existence, would, if then attainable, have been worth, as aid, thousands of dollars to his first few years' labors. He did not then, or since, think that any information applicable to his wants and his ignorance came from "too far north," or too far south; and he would have rejoiced to have obtained light, if it had existed, whether from scientific research, or practical observation, from any available source, or any remote region. However, these remarks will not be seen by "Middle Country;" and if they should be, by being republished, he probably will attribute them to our anxiety to secure the profit of selling him a 50 cent pamphlet, which, if desired, would be gladly *given* to him or to any other person who would probably receive benefit from its instructions. We do not know, however, that "Middle Country" would consider our precepts and facts as coming from "an authentic source."

A general remark is called for here by the concluding passage in the above article—though we have said and urged the same, in different forms, many times before. We did not happen to see the piece of our esteemed fellow laborer, the very intelligent editor of the 'Carolina Planter,' which compared "liming light and sandy land" to giving "bitters without beef-steak," and therefore we may not comprehend its scope and force. But we entirely concur in the expression *in one sense*, which was, we presume, that in which the editor spoke—and as much dissent from it in *another sense*. It is very true that marl, or calcareous earth, does not act *directly* by furnishing food to plants, or as dung and other putrescent manures do; and whoever marls under mistaken views in this respect will probably incur loss, if not do actual injury. If *all aid* from putrescent manure, in every form, were withheld, and if the very customary system of unceasing exhausting cropping is pursued, then indeed, to land so treated, marl would be, in a great degree, "bitters without beef-steak." But, on the other hand, it is not necessary that artificially prepared putrescent manures, from the stable or barn-yard, should accompany marling, to render the latter highly profitable. That, if attainable, would certainly be better; but without a load of such manure being applied, enough putrescent matter may be given to land to enable marl to double or even quadruple its products, by merely letting the land rest, and be covered by, and not be deprived of by grazing, its own natural growth of vegetable matter, by which nature manures every soil that is capable of being enriched; unless where man acts to cut off, or render useless, this natural and abundant supply. Yet without calcareous earth to combine with it, and render it operative, and to *fix* it in the soil, this or any other supply of vegetable manure given is not only like "beef-steak" without "bitters," (reversing Dr. Gibbes' metaphor,) but also is given to a stomach so weak as to reject, or to refuse to digest, either beef-steak or the lightest and most nourishing aliment. When such rejection, by a

* "By a geological survey of Virginia, in a district of country considered unimportant, beds of marl have been discovered and analyzed; and, by successful experiment and application to a poor soil, have enhanced the value of lands from comparatively nothing to a very high price." *Address to the Agr. Soc. of Barbour, Ala.*

weak and disordered stomach, is caused by the presence of *acidity*, Dr. Gibbes would certainly administer lime-water, or magnesia, or some other calcareous or alkaline neutralizer of acids. In precisely the same way let him reason as to the acid soils of South Carolina. Give marl to destroy the existing acid, (which acid forbids improvement and destroys the productive power of the soil,) and to create digestive and assimilating action, and let the land have but a moderate and *profitable* share of rest, to enable it to produce vegetable manure for itself, and we will venture to assert that the result will be a doubling of permanent productive power, and of net profit on the cultivation, within two years after the commencement of the course of improvement.

But as unreasonable as is such a deduction, it is generally the case that new marlers expect to derive this great profit without paying any thing of the necessary consideration required to secure it. Marl is applied to land that perhaps has been severely cropped in corn or cotton for a dozen years before, and without any more rest, or other means to obtain vegetable food, being allowed afterwards. Of course there is so little effect seen from marling under such circumstances, that the experimenter considers and so reports it as *none*, or almost *none* —and thence he concludes that the manure is worthless, and, perhaps, all that has been promised from it, (under very different circumstances,) as altogether false. We have known many, very many cases of this kind; and have been greatly surprised, until the frequent recurrence of the same thing became custom, that intelligent cultivators should overlook and neglect every *condition of success required*, and distinctly stated as such in the instructions published, and yet expect the degree of success which the observance of those conditions would have secured.

But if the requisite of vegetable or putrescent manuring is enforced on men's minds, then will come another grand objection. "Oh! if I am to manure in some other way all the land I marl, I cannot marl much; and for so much, the land could do very well without marl." Wrong in both of these positions—though we cannot here discuss them in full. We will merely say that while we were barely able to give prepared putrescent manures to 10 acres of land a year, (and sometimes did not to 5 acres,) that rest and natural vegetation served to manure (however slightly) 100; and that the whole 100 acres were easily marled the same year. And further, if without the *medicine*, marl, or "bitters" so given, that the "beefsteak," or food alone, both the rich and the poor, would have produced but little visible effect, and certainly no clear profit.

The writer of the foregoing article certainly imposes on Dr. Gibbes a great and most unreasonable task, and which would require the labor mental and physical, of a year, for him to perform fully. Nevertheless, if he will undertake it, to any extent, we are satisfied that the task would be in excellent hands; and we shall be among those who will most heartily rejoice at the means being thus used, in the most palatable and effectual manner, to give to the planters of South Carolina the instruction which they so greatly need, and which would offer to their acceptance such great individual profits and general improvement.

ED. F. R.]

EXTRACT FROM THE REPORT ON THE CULTURE OF THE MULBERRY, AND THE MODE OF REARING SILK WORMS IN THE ENVIRONS OF PARIS, IN 1836.

Made at the Royal and Central Society of Agriculture, in the name of a special Committee composed of MM. the Viscount Debonnaire de Gif, Jaume Saint Hilaire, Audoin, and Loiseleur Deslongchamps, reporter.

* * * * * * * *

Until now, they were generally in the habit of judging of the product of the rearing from the yield of an ounce of seed, but the number of eggs being liable to vary in the quantity from forty to fifty thousand, M. C. Beauvais thinks it more rational to determine it from the weight of leaves used for so many pounds of cocoons. At the south it is generally supposed that two thousand pounds of leaves, not culled, are required to feed worms of an ounce of eggs, which produces on an average from fifty to sixty pounds of cocoons.

In taking the weight of the leaves for the basis, two thousand pounds of leaves have produced one hundred and eighty pounds of cocoons in the last rearing made at the *Bergeries*. M. C. Beauvais did not give us in his various notes, the precise details of the expenses of his rearing; we have merely found that it results from the general accounts which include the rent of the ground, the ploughing, the trimming of the mulberry plants, the interest of the capital of the plantings and of the cocoonery, the expense of the gathering, of manual labor, the heating and lighting, etc.; that the pound of cocoons of sixteen ounces, amounts only to fifteen cents. M. C. Beauvais has undertaken, for seven years past, on silk worms, a set of experiments which may be usefully put in practice. In the note he gave us upon that subject, he insists principally, upon the means by which one can obtain a perfect equality among the worms. He thinks that the success of rearing depends upon the worms going *regularly* through the different stages of existence. He wishes them to hatch as simultaneously as possible, that their moultings should be accomplished at the same time; and that at last the worms should mature at once, that there may not be any dilatory among them, during the most essential period of their existence, the *formation* of the cocoons.

To obtain such advantageous results, under all circumstances, M. C. Beauvais states that regularity in feeding the worms is one of the best

means that can be made use of; and he is besides persuaded, that instead of using common stoves, that distribute the heat more or less irregularly, preference should be given to M. d'Arcet's apparatus, which has the double advantage of distributing the heat equally in all parts of the apartment, and to purify the air by constant ventilation.* We highly approve of the views of M. C. Beauvais, and with him, we recommend to the growers of silk worms, the use of the apparatus for the purpose of heat and ventilation.

M. C. Beauvais has tried carefully to discover the causes of the diseases to which silk worms are subject. His experiments have led to the discovery that many of them originate from imperfect eggs, or bad stock. He insists, therefore, not only on a judicious choice of the cocoons, which must always be of the most beautiful and even species, but he advises when the millers have left them to reject all those that have any defects, and to preserve for the reproduction those only which give the appearance of a strong constitution. The male miller according to M. C. Beauvais, must have projecting eyes, long horns, very thick and arched: wide but slender body, covered all over with a glossy down; in fine, the wings must be large, and spread out. The rearer must throw aside the males that have part of their bodies bare of down, and of which the lower rings are darker than the rest of the body; above all he must reject all the males that have short wings clipped or folded up. The female must exhibit the same character as the male, with this difference, that the body must be wide and flexible. All females whose bodies are immeasurably long, showing in each movement rings without down, must be thrown away.

* * * * * * * *

The same may be said of an experiment of another nature, which M. C. Beauvais made in the spring of 1836, in rearing a certain quantity of worms after the method of the Chinese. According to that method they feed the young worms forty-eight times the first day they are hatched, thirty times the second, twenty-four the third, and twelve during the remainder of the time of rearing. At the same time that the worms are fed in this manner, they are kept in a high temperature, which is from 93 deg. to 95 deg. Fahrenheit during the first two stages, and from 81 deg. to 84 deg. Fahrenheit during the rest of the rearing. By this method the worms, according to M. C. Beauvais, eat more, while they consume less leaves, because they make much less litter, and the time of rearing is shortened. That which was made in 1836, at the *Bergeries*, from this process, lasted only twenty-one days, and from what has been stated to us, the worms evinced during the whole course of their existence, a strength and vigor which are not common to them in the rearing effected in a lower temperature by 9 to 11 degrees, and which lasts ten or twelve days longer.

According to M. C. Beauvais, the advantages which would result from a rapid rearing extend to all the economical circumstances of this industry. They embrace the mulberry trees, manual labor, the buildings, and even the success of rearing; but all these advantages cannot be obtained except the heat, dampness, and the frequent feeding, are in perfect harmony together, for these three considerations are so intimately blended, that unless they perfectly accord, he does not think they can succeed, and believes too, that they may expect greater mistakes than upon the old plan. Thus the experiment of rearing silk-worms under the influence of a high temperature, made by M. C. Beauvais in 1831, and renewed in 1832 with an excellent heating apparatus, completely failed. It was only in 1836 that it succeeded, in adding to the high heat continued feeding, and a certain constant dampness.

With a temperature of 81 to 84 degrees Fahrenheit, you must keep up a moisture of 85 to 90 degrees of Saussure's hygrometer.

It would, no doubt, be a very great advantage if it were possible to diminish conveniently the duration of the period of rearing, for it might furnish the facility of attending several rearings each year, whenever a double or treble quantity of mulberry trees could be had. This is what your reporter has explained elsewhere. But whilst we commend the generous efforts of M. C. Beauvais to perfect the progress of the art of rearing silk-worms, your commissioners dare not recommend the new method to accelerate the mode of rearing to those just engaged in it. They can only manifest the hope, that new and multiplied experiments will be made on that subject. They ought not, besides, to allow those persons occupied with this industry to be ignorant of the fact of their dreading that in shortening the life of the silk-worms, they should not have time enough to digest, in a proper manner, the nourishment they take; that the juices which must be identified with their own substance, are not sufficiently perfect to facilitate the secretion of the silk, and that secretion being too precipitate has not all the qualifications required for the worm to spin its cocoon and compose it of a thread both firm and solid.

We regret that M. C. Beauvais did not give us a certain quantity of cocoons of his rearing, brought forward by the means mentioned above, so that the silk could be removed, as effected in those of his common crop; but we ought to mention on this subject, that M. Boissiur de Sauvages had already tried to rear silk worms under the influence of a high temperature, and that he had succeeded by this method to abridge the *time* of rearing in such a manner that it only lasted 24 days, instead of 36 to 40. This author states that the product obtained was abundant.

M. C. Beauvais proposes to make this year, new experiments on this method, and he has even the intention of raising the temperature of the locality in which he means to place his worms, so as to shorten the course of the rearing, and to reduce it to eighteen days, if possible.

On this subject we shall observe that if we must yield to the opinion and experience of M. Boissiur de Sauvages, there is a term beyond which it is not possible to shorten the life of the worms, for the period was absolutely the same in two rearings undertaken in a high temperature, although, in one of them the heat to which the worms was subjected was greater by four degrees, than the other. Finally, we will express again our fear that the silk produced too rapidly under the influence of a very high temperature, will not have the same qualities as that raised under ordinary circumstan-

* See description and plan of D'Arcet's apparatus at p. 77 of vol. VIII. Far. Reg.

ces. In fact, we learn from several persons well versed in the manufacture of silk, that this material coming from warm countries, such as India, Syria, &c., is much less esteemed and cheaper than that which has been collected from the temperate parts of Europe. For this reason we shall not fail the next season to gather a sufficient number of cocoons produced by a rapid mode of rearing, to enable us to compare the intrinsic quality of their silk with that of the same material obtained by means of the old process. Until then we shall forbear giving our opinion on the merit of the abridged mode of rearing by the influence of a high temperature, and we think it must be left to time and experience to prove what this method will show in the way of advantages or difficulties.

It is very desirable that all the worms should hatch the same day, that the period of their moulting should not be different, and finally their ascent on the spinning frame should be made, if not exactly at the same hour, at least in a short space of time, as, for example, in one day. M. C. Beauvais thinking that the inequality, more or less great, observable in worms of the same rearing, proceeds from the cause that the female butterflies are not generally hatched the same day, and also because they take several days to make up the amount of their laying, though that all the innequalities observable in the different stages of the existence of worms, might originate in the manner in which the eggs are made in the common way. To remedy this inconvenience, M. C. Beauvais tried at the time of his last crop, the following process. He selected at first ten times more cocoons than are necessary to produce one ounce of eggs, and as the millers came out, he preserved only those hatched the same day. Afterwards he did the same thing for the eggs that were laid by the female millers after their fecundation by the males. Instead of preserving all the eggs of the whole laying, he reserved for a future rearing, those only laid by the females during the twelve first hours after their separation from the males. We ought likewise to mention, that he managed so that the length of the coupling should be the same for all the females, and as he had kept ten times more cocoons than were necessary to make an ounce of eggs the first day the millers came out, as soon as he had enough males and females to give him the quantity of eggs he required, he stifled the chrysalis in the remaining cocoons so as to preserve them for reeling. By means of this process M. C. Beauvais hopes that these eggs having all been produced at nearly the same time will have all the qualities necessary to hatch simultaneously and with an equal and perfect organization. It will then be the business of the rearer, he tells us, to do nothing to interrupt this harmony during the life time of the worms; and the palm will be given to him who will obtain a spinning as rapid and regular as their hatching has been.

Such are the hopes of success that M. C. Beauvais entertains of this new method of producing the eggs. We hope sincerely that he will not be disappointed in his expectations, and that he may obtain such happy results; but we ought to mention to you, gentlemen, it appears very difficult that, notwithstanding all his care and precaution, he should succeed in reforming completely the inequality between worms of the same rearing, an inequality due, perhaps, to one of the laws of nature, for we remark it every where among living beings. However, if even the new experiments of M. C. Beauvais, on the method of improving the laying of the eggs of the silk-worms should not have all the success wished for, it is nevertheless probable that the practical rearing and physiological history of the insect will derive advantages therefrom.

During the rearing that this able and zealous agriculturist made in June, 1835, sixteen young men, established themselves in the *Bergeries de Senart*, and every day they were at the establishment to assist in all the operations concerning silk-worms, and to instruct themselves by practice. In the spring of 1836, the same thing was renewed, but the crowd of persons, who came to learn the art of rearing silk-worms in the model cocoonery of M. C. Beauvais, and to perfect themselves by the lessons of such an excellent master, was greater than that of the preceding year. Your commissioners visited the *Bergeries* twice during the course of the labors and they found each time a collection of thirty persons, composed not only of young men, but of men of all ages, who, during one month, drew such instruction from the establishment, that each of them was capable of managing a cocoonery himself. This is what we ascertained at the period of our second visit, from the many questions put to them, and the satisfactory answers received. Thus in a very short time M. C. Beauvais will have made excellent scholars, who will be able in their turn, to give solid instruction, and diffuse good methods in those districts, where they intend establishing this new branch of agricultural industry.

M. Henry Bourdon, began to plant mulberry trees at the end of the winter of 1835, and since that time he has increased his plants in such a manner, that now he has thirteen and three-fourths acres of trees of this species planted permanently, and at various distances, according as he wished them to be more or less developed. The nearest ones are about four feet from each other, and the farthest ones, are from ten to eleven feet. This planting made on thirteen and three-fourth acres includes in all 10,715 trees, viz:

Multicaulis - - - -	5,015
Trees grafted in May, 1836 - -	4,100
Wild mulberry trees which must not be grafted, and of which the leaf is intended to feed the worms in the first age - - - - -	1,600
He has also appropriated a space of ground for a nursery, in which he has now young plants of two years -	5,300
Young plants of one year - -	15,000
Cuttings of multicaulis - - -	10,000
Total - - - -	30,300

which 30,300 mulberry trees, added to the 10,715 planted in the thirteen and three-fourth acres stated above, gives him a total of 41,015 trees, all intended for low trees.

The greater part of these mulberry trees being yet too young in 1836, to yield the quantity of leaves, M. H. Bourdon required to feed the worms he intended rearing in the spring, he tried to get some in his neighborhood, and he was fortunate enough to find a sufficient quantity to feed the worms produced from two ounces of eggs.

Twice, gentlemen, your commissioners called on M. H. Bourdon to see his mode of rearing silk worms.—The first time was on the 4th of June, and the 2d of July, at the moment of the gathering of the cocoons. At each of these visits the cocoonery was examined by them with the greatest care in all its details, and they have always been very much satisfied with the perfect order which reigned, and with the good care bestowed on the worms.

M. H. Bourdon, at our suggestion, kept a regular journal of the rearing made in the month of June last. We here give you a short extract so that you may know the result. The eggs taken out of the cellar the 19th of May, and brought gradually to the temperature of 70 deg. Fahrenheit were placed on the next day in the room intended for the hatching, where the temperature was successively raised one degree per day and the hatching commenced the 25th at a temperature of 79 deg.

M. H. Bourdon has raised silk worms from three kinds of eggs, which were decidedly different from each other, and which yielded him various products. A reating of three-fourths of an ounce, made with eggs received from Roquemaure, in the south of France, lasted only thirty-one days, the worms having been kept constantly in a temperature of 75 deg. Fahrenheit, and the duration of the different stages has been as follows:

The	1st	stage	lasted	-	-	-	6 days
"	2d	"	"	-	-	-	5 "
"	3d	"	"	-	-	-	6 "
"	4th	"	"	-	-	-	6 "
"	5th	"	"	-	-	-	8 "
			Total,				31 days

During the whole period of rearing, they were fed six times a day, without counting occasional intermediate feedings, as the worms seemed to require it.

The hurdles were changed *every day* during the first stages, also during the fourth and fifth stages, but were changed only *every other* day during the second and third stages. When the worms had moulted instead of immediately giving food to them M. H. Bourdon waited 24, 30, and even 36 hours, and the method proved favorable to their health and the economy of the leaves. He supposes that after the fatigue of moulting, the worms have need of rest.

When the worms came to maturity, their ascent on the spinning frames was accomplished in thirty-six hours, and it was remarked, instead of crawling for some time, as is often the case, they began spinning almost immediately. There were very few imperfect cocoons. The quantity of leaves consumed by the worms hatched from the three-fourths of an ounce of eggs that came from Roquemaure was 1000 pounds and the product in cocoons 75 lbs. These cocoons were of a very good quality, and of a very pure white, like those of the beautiful *Sina* species. It required 240 to 260 to make a pound.

We have already spoken to you, gentlemen, of a species of worms called the *Syrian* which M. C. Beauvais attempted to cross with the *Sina*. We shall not repeat the remarks already made above, respecting this crossing; we shall only observe that it is with the *variety* of worms produced by the coupling of the *Syrian* males and *Sina* females, or males of this last variety with the *Syrian* females that M. H. Bourdon has made several interesting experiments. We could not relate them all without exceeding the bounds of this report, and that is the reason why we shall be satisfied to give you the following. Struck, like M. C. Beauvais, with the irregularity which almost always exists in the hatching of the eggs as well as at the time of the moultings and of the ascent, M. H. Bourdon thought that this irregularity might be attributed to the use of the eggs laid at different times in the rearing. In order to ascertain if the irregularity in the different phases of the existence of the worms was owing to the causes he suspected, be arranged in 1835, at the time of the laying of the female millers, two different cloths to receive the eggs. On the first cloth he caused the laying of half of the female millers to be complete; on the second cloth, on the contrary, he received only those eggs laid during the first twenty-four hours by the other females. In the spring of 1836 the two kinds of eggs, obtained by these means, having been placed at the same time in the hatching apartment, those proceeding from the first cloth took two days to perfect their hatching, while those of the second, proceeding only from the laying made in twenty-four hours, took only one day to hatch. There remained but an insignificant number of eggs. M. H. Bourdon has besides assured us that the worms hatched in twenty-four hours, had constantly a great superiority over the others, as much for their equality and regularity during all their stages of which the moulting and the ascent are the principal, as for the economy of the leaf. It is hoped that new experiments will confirm these fortunate results, and if those of the same nature, undertaken by M. C. Beauvais, succeeded equally well, the rearers, will no doubt hasten to adopt this new method of procuring eggs. In that case the loss of several hundred or several thousand cocoons will be trifling, compared with the advantages which might result from this improved process. We omitted to mention that the cocoons spun by the *Syrian* worms were much larger and heavier than any we have ever seen. One hundred and ninety-seven of those cocoons taken by chance, weighed one pound, and in selecting the finest and heaviest, 167 only were required to make up the same weight.

The third variety of eggs that M. H. Bourdon caused to be hatched in May, 1836, was sent to him from Valencia, in Spain, a country which was formerly much famed for its silk worms. These eggs, far from answering his expectations, occasioned him enormous losses. First, those from Valencia hatched in a very irregular manner; afterwards, at each moulting, and even at every change of the hurdles, the mortality among the worms was very great. A sufficiently large number of worms which had dragged on their existence until maturity, died at the moment of their ascent upon the spinning frames. Lastly, from an ounce of eggs hatched, M. H. Bourdon extracted but three pounds eight ounces of cocoons, for which product he fed out one hundred pounds of leaves. He is doubtful whether he is to attribute this drawback to the journey, to the change of climate or to the manner in which the eggs were produced. In the actual state of the science it is still impossible to determine what can be the causes which

have been so hurtful to the worms produced from the eggs of Valencia, in Spain. Your reporter can only mention that he received in 1824 eggs from Smyrna in the Levant, which, after having travelled by sea, were sent to him from Toulon in a letter by mail, and the worms coming from this seed showed no particular disease, and they arrived at the period of their maturity without a greater number dying than is customary in the ordinary rearing. M. H. Bourdon in the arrangement of his cocoonery made many useful modifications, of which we give the following account.

First.—Instead of disposing end to end his hurdles which were two feet wide, and five feet long, he has juxta-placed them, two by two, and the width of the two hurdles united together is such, that a single person can direct the feeding on the whole surface in alternating from one side to the other; thus by this juxta-position of the hurdles, much space is gained without an injury to the whole mode of operation.

Second.—By means of light wooden rods placed on the cross pieces of the props the hurdles can be removed easily.

Third.—The hurdles are arranged in such a manner, that the one placed on the outside, or at the passage, can be removed at will, which greatly facilitates the labor chiefly for the cleansing of the hurdles.

Fourth.—M. H. Bourdon makes use of nets like M. C. Beauvais to remove his worms from one place to another, or to divide them on the hurdles, but his nets are fixed on frames made of very light wood.

Finally, M. H. Bourdon has adopted in his cocoonery, to serve as props to his hurdles, a range of single posts, which can be easily taken to pieces after the rearing, so that the locality may serve for any other use.

All these modifications introduced in a small apartment appeared to us susceptible of being easily applied to a large establishment. It suffices to have seen them operate, to be convinced that they do not require a much greater increase of expense in the fixtures.

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M. Aubert in 1836 reared worms produced from 2½ ounces of eggs proceeding from worms reared in 1835 by M. Boucher, and the cocoons of which did not appear to differ very sensibly from those of the *Sina* species, except that they were perhaps a little smaller and weighed less. The first eggs were placed on the 20th of May in a hatching room where the temperature was 63 degrees Fahrenheit, and it was brought the following day to 74½. On the 25th of May, the thermometer being at this last elevation, the hatching commenced at 2 o'clock in the morning according to M. Aubert's observation, and ceased at 10, and as very few worms were hatched they were not preserved. On the 26th the thermometer being at 77 deg. the hatching commenced again at 2 o'clock in the morning and continued until noon. Many more worms having been hatched than on the preceding day they were saved and fed. On the 27th of May the thermometer being still at 77 deg. the hatching recommenced abundantly, always at 2 o'clock in the morning and lasted until 5 o'clock in the evening. On the next day, the 28th, the temperature being still the same, the hatching began anew from one o'clock in the morning until eleven.

All the worms hatched during those last two days were reared with those of the 26th, but those hatched on the 29th, being much reduced to number were neglected. In this manner the entire rearing was composed of worms hatched the 26th, 27th and 28th of May.

The application of the excellent system of ventilation which we owe to our honorable colleague M. d'Arcet was made in the cocoonery of Neuilly, and the worms were maintained in perfect health. During the first stages M. Aubert fed his worms twelve times a day, from six to eight times during the third, and five times during the last two, to which slight repasts were added during the fifth stage.

On this subject we think proper to express our opinion that it would appear more rational to reserve the twelve meals a day, for example, for the last stage, which is the time the appetite of the worms becomes greater, and that it would be possible without inconvenience to reduce the meals to 4 or 5 during the two first ages. We advise rearers to make a few experiments on this subject.

During all sorts of weather the worms of the cocoonery of Neuilly had cleansed leaves only, and they were given to them cut into small pieces until the 3d stage.

From the second stage until the time of spinning, M. Aubert changed the beds of his worms every other day by means of framed nets let in the hurdles. The changes were made, with the utmost facility and the worms crawled up quickly on the new leaves which covered the nets, without scarcely any remaining on the litter. To give an idea of the promptitude with which the changes were effected M. Aubert assured us that during the 5th stage, two persons, besides a third one charged especially to remove the litter and to transport it out of the establishment, could in two hours attend to the changing of 48 hurdles, forming together a surface of 469 square feet. What rendered it easier to accomplish the changes on the upper hurdles was that M. Aubert caused pullies to be placed in order to bring down all those that were too high and beyond common reach.

As the worms of Neuilly were hatched in three different days, three sections of them were formed, which during all the rearing continued to progress at certain intervals from one another. There has also been considerable irregularity between worms hatched the same day, and when we visited the cocoonery for the second time, the 13th of June, the worms being then at the beginning of their third stage, we took notice of a certain quantity which, as to size, appeared inferior and backward by several days. We observed a person selecting them carefully from the hurdles to put them aside. The heat of the cocoonery was 77 deg. during the first two stages; in the third it was limited to 72 deg. during the 4th it was between 70 and 72 deg. and finally it was not more than 68 degrees during the 5th stage. Under the influence of this temperature the worms of the first section crawled on the spinning frames on the 28th day, those of the 2d on the 30th, and those of the 3d section on the 32d day. To the dilatory ones six more days were required that they might all be spinning. As to the worms of the *Sina* species, of which M. Aubert only raised one eighth of an ounce, they spun on the 30th day, but a very small number remaining on the litter, and during the 48 hours

which followed they began, successively, to make their cocoons.

To prevent the worms from falling at the period of their ascent M. Aubert placed on the upper part of his spinning frames a band of canvass about 6 inches high, fixed outside, and which, without intercepting the air, has greatly contributed to preserve a large number of worms from falls, which hurt them and incapacitate them from making their cocoons. The expense of this was very trifling and well compensated by an abundant crop of cocoons. The consumption of leaves was,

during the first stage, - -	12 lbs.	7 oz.
2d " - -	48 "	3 "
3d " - -	103 "	
4th " - -	276 "	
5th " - -	1,419 "	
Total, - - -	1,858	10

This quantity of leaves produced 167 pounds of cocoons.

The royal theoretical institution of Grignon did not wish to be behind in the improvements regarding this branch of agricultural industry, and accordingly M. Bells, director of that establishment, commenced in the year 1833 to plant mulberry trees, and on the 4th of July last when your commissioners went to Grignon, they found about 3¾ acres of ground in a perfect state of cultivation, and planted with 1500 feet of mulberry trees of low stalks, of which four-fifths are grafted. It was with the leaves gathered from those trees that the rearing of last summer was made.

According to a statement given us by M. Bells, his entire rearing lasted 36 days, and this delay may be attributed to his cocoonery having been kept at a temperature, on an average, of 70 deg. (Fahrenheit,) and to the circumstance of the thermometer falling even to 68 deg. during the seven last days of the 5th age. This low temperature has no doubt lengthened the time of his rearing, and was the cause that the worms were eight days in mounting. Another more serious disadvantage has contributed no doubt to diminish the product of the same rearing, viz: that on the fifth day of the fifth stage, instead of increasing the food of the worms, he, fearing he would not have a sufficient quantity of leaves, diminished the quantity given to them instead of increasing it in proportion as he should have done. Thus the worms to which on the fourth day of the fifth age they had given 151 lbs. of leaves divided into nine repasts, had on the fifth day 121 lbs. instead of 190 lbs. which was requisite. On the following day, and until the end of the rearing, he continued to diminish the quantity of leaves at least one third, and gave them only four repasts in twenty-four hours, instead of from seven to nine, which was necessary. This no doubt had a direct influence on the crop, and perhaps diminished the product from 15 to 20 lbs. so that the 105 lbs. which he obtained might have reached to 120 or 125 lbs. had he not feared a scarcity of leaves. On the 14th of July when we visited the plantation of mulberry trees we discovered that his fears were groundless and it appeared to us that there remained as many as 3 or 4 quintals of leaves on the trees, which fifteen days previous, could have been gathered with advantage to complete the feeding.

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On this last subject we cannot conceal from you that if we do admire the fine cocoonery of M. de Grimaudet we cannot recommend it as a model to be followed. Instead of two immense cocooneries which touch each other and are united at right angles, each of which can contain the worms proceeding from 80 ounces of eggs, from which 3 or 4 millions of worms must be produced, we should have been better satisfied if he had distributed in several parts of his property from 8 to 10 cocooneries, in each of which from 15 to 20 ounces of eggs could have been deposited. Until now, experience has shown that the rearings effected in small apartments have always succeeded better than those undertaken in large rooms.

M. de Grimaudet it is true has adapted to his cocoonery the fine ventilating apparatus of M. d'Arcet which succeeded so well in 1835 at M. C. Beauvais', but is it not to be feared that this apparatus, excellent as it may be, might be insufficient when applied to too large a room, in which an immense quantity of worms, several millions for example, will be assembled, thereby insuring its merits as applicable to cocooneries of smaller proportions?

The worms fed in small secluded cocooneries could be preserved from disease more easily than in those of larger dimensions, and if situated some distance from one another the contagion could not spread, but would be confined to the one in which the disease originated. We cannot therefore approve of the vast and splendid cocoonery of M. de Grimaudet, and fear that his system of building may prove fatal to an enterprise to which we so strongly wish success. That which M. de Grimaudet made in Villemomble in 1835 he repeated near Versailles in 1836. In the course of the last year he caused to be erected at the gate of that town, near the gates of Montreuil a new and splendid cocoonery 120 feet in length, 27 feet in width, and 18 feet in height. It is his intention to rear therein the worms produced from 120 ounces of eggs, and in order to provide food for such a great number he has already commenced near his buildings a plantation of mulberry trees of several acres.

The 2d of July we visited the cocoonery of M. Christophe, in Vigneux, but the worms had already spun, and the cocoons were of an excellent quality.—We remarked particularly at his establishment several cocoons produced from worms which we were assured had been fed, during the first fifteen days of their existence, with lettuce leaves. We mention this, but cannot vouch for it as a fact—but if, by new experiments, it could be confirmed, it would prove of some importance.

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Upon every side efforts are making to extend in different parts of France the culture of the mulberry tree and the rearing of the silk worm, which, formerly, many persons thought belonged exclusively to the southern provinces of France. Not only have all the experiments made in the neighborhood of Paris succeeded, but the products have, in general, surpassed those obtained at the south.

These happy results are owing to the high state of perfection to which the northern rearers have brought the mode of rearing the silk worm, and principally to the application of the apparatus of ventilation to the cocooneries invented by M. d'Arcet. A few years more and the north of

France will realise immense profits from this new industry.

The neighborhood of Paris produces already the handsomest silk in the world as regards whiteness, fineness of texture, and elasticity. We must now apply ourselves to its regularity and its production on a large scale. The profits of this new production are enormous, but it requires a knowledge and attention which are met with only among learned and enlightened proprietors. That branch of industry never prospered in the hands of a proprietor averse to innovations or improvements. This circumstance is authenticated by the bad silks produced in Touraine and Provence.

It must also be remarked that the countries which have raised silk for the longest time, such as China, Persia, Turkey, &c., are also those that are the most averse to improvements, and consequently they now produce the worst silks; such as sells from 50 to 70 per cent. under the Italian and French silks.

THE MODEL FILATURE AT PHILADELPHIA.

From the Journal of the American Silk Society.

The results obtained by the establishment of this filature, have been so gratifying to those who are immediately connected with the company, that some notice of them may be interesting to your readers, to whom you have made our establishment familiar, copying our brief prospectus into your last number. Our capital is $20,000, in shares of $20 each, and we operate under a charter obtained from the governor of Pennsylvania, whom a general law of the state authorizes to issue letters patent, under certain limitations, for the incorporation of persons embarking in the silk business. Under this law charters are obtained directly from the governor, without the trouble and delay of an application to the legislature. The whole expense is the fee of $4, required at the secretary of state's office. A limited amount of stock was sold, and only $5 per share required to be paid: a principal object with us being to get the filature into actual operation, no matter in how humble a way. The necessary apparatus being obtained, advertisements were extensively published, and are yet continued, offering to purchase at fair prices, all the sound or pierced cocoons that might be brought to us. Numerous lots, from Tennessee, Virginia, Pennsylvania, and New Jersey, very soon came in, and the cash was paid for the whole, to such as were willing to sell. At present, the supply seems to have entirely ceased, and will probably not revive until the new crop is ready.

Among the cocoons purchased by the directors were some very small lots of half a bushel up to two bushels, raised in New Jersey by indigent and aged females, and some by little boys in this city. Four dollars per bushel was the highest price awarded to any; but it would be difficult to convey to you an idea of the gratification and delight which the prompt payment of the money afforded to these persons. Every one expressed himself fully satisfied with the price, some said it was quite as much as they expected; and many were encouraged to go on, and double or treble their crops the present year.

We are satisfied the happiest effects have been produced upon the public mind, by even the limited exertions we have been able to make. We have three Piedmontese reels, and six to eight females employed in preparing the pierced cocoons by removing the shell of the chrysalis, boiling the cocoons, and spinning them into yarn, which is afterwards converted into thread for knitting or weaving. The spinning is performed on a common spinning-wheel, and the whole process is carried on at the filature.

A young lady, who volunteered as a reeler, has been, at the time this is written, engaged about three weeks in reeling cocoons. She has been working on a lot from Tennessee, which are probably as indifferent a lot as could be produced. they are very small, covered with a superabundance of floss, very sharp pointed at the ends, and possess no merit but that of reeling freely. They have evidently been made by sickly worms; yet a bushel of these indifferent coccons when flossed, affords three-quarters of a pound of silk, as ascertained by actual measurement and weight. No sort of doubt exists with us, that if we could only obtain *good* cocoons, that a full pound and a quarter would be the product of a bushel. But no good ones have been offered to us. This young lady, after three weeks' practice, reels three-quarters of a pound of silk daily, (about 30 to 40 fibres to a thread,) and for all of her reeling during the first ten days, we have been voluntarily offered $5 50 per pound cash, and have sold it at that price. Her subsequent reeling has been sold for $6 cash; and that price may be guarantied for all we can produce, if it were a ton every week. The causes which have led to the present depression in business of all kinds—the scarcity of money, and the low prices to which all staple articles have receded—have had no effect upon the price of either raw silk or sewing silk. Six dollars per pound may be depended on for raw silk well reeled, and ten dollars for all good sewing silk. A girl, after two months' practice, if ordinarily attentive and ambitious to excel, will reel one pound daily without any extra labor, during the usual working hours.

Our filature is visited daily by strangers from all parts of the Union, and the various operations of reeling, spinning, &c. actually going on, afford abundant gratification to all. Care is taken to explain to such the particulars of the various processes, and to answer the multitude of inquiries made by every stranger who visits us. This office, in the absence of the directors, (to whom the sole conduct is entrusted by the charter,) is performed by Mrs. H. McLanahan, the superintendent. This lady is eminently qualified, by a practical knowledge of all the branches of the silk business, to be the efficient head of such an establishment. A case is also shown, containing samples of silk reeled by this lady, of a quality so exquisitely fine, as to be worth $12 per pound; together with many other specimens of her superior skill.

A small pamphlet has been prepared, containing a sketch of the objects of the association, with the charter and by-laws, and 2,000 copies were printed for gratuitous distribution, 1,000 of which were immediately distributed by mail to persons interested in the silk-business, in various parts of the country. Copies of this pamphlet are

given to strangers who visit the establishment. The directors have been surprised to observe that so small a quantity of cocoons has been offered for sale, though they have taken so much pains to apprise the public of their readiness to buy for cash. The new crop, however, may soon be expected to come in, as large quantities of worms are already hatched out in this vicinity, and if ordinary success attend the growers, some very heavy crops will be realized, besides many smaller ones. When good cocoons come in, our operations may be expected to go on much more to our satisfaction than at present.

We believe the business of buying cocoons and reeling the silk for immediate sale in its raw state, to be a profitable business of itself, whether carried on by companies or individuals. By the latter, no doubt, a greater profit will be secured, as all individual enterprises are carried on with more economy, tact, and skill, than those of a company. Cocoons of good quality can be reeled for about seventy-five cents per bushel, affording one pound of silk worth $6. Hence, if $4 be paid for them, there will be a clear profit of $1 25 per bushel; and as a girl (with a child at $1 weekly, to turn the reel,) can reel a bushel daily, ten such girls, if constantly employed on good cocoons, would realize to the proprietor of a filature of ten reels, a gain of $12 50 daily, from which the slight charges of rent and fuel, are to be deducted. A capital of $300 would start such a filature, as the silk can be sold for cash daily or weekly, according to the wants of the proprietor. As so small a capital is sufficient to secure so important an aid to the silk business, the friends of the cause should assemble and establish small filatures in New York, Baltimore, Richmond, Norfolk, Pittsburg, Lancaster, Cincinnatti, Wilmington, Burlington and other principal towns, for the immediate purchase of the new crop of cocoons. We are satisfied no measure could possibly be adopted, which would so certainly place the whole business on a solid foundation, and strengthen the confidence of those now half-way inclined to undertake it.

Care must be taken in purchasing cocoons. Some are rendered utterly unfit for reeling by being scorched in curing them. Others are made equally worthless by suffering fermentation to take place in them, from not drying them sufficiently after curing, if cured by steaming. A little practice will enable a girl to detect imperfections of this kind in cocoons offered for sale—but, perhaps, in estimating expenses, some allowance should be made for loss in buying bad cocoons. There has been quite a demand in this city during the spring, for females who understand rearing worms and reeling cocoons, and a sufficient number could not be found to supply it.

Among the reels at the model filature, is one imported direct from Piedmont a few years since. Though built in an apparently clumsy and lumbering style, both as regards the timber and the workmanship, yet when the silk reeled upon it is compared with that produced on those American reels which are called *improvements* on the Piedmont machine, the difference in favor of the former is so manifest as to place its superiority beyond all question. The silk is certainly possessed of greater lustre; it is more readily cleared of knots and burrs, and it is laid on the aspel in a different sized skein. The great strength of the aspel maintains a uniform tension in the skein as it is drying, and to this we doubt not the superior lustre is owing. The shrinking of a half day's reeling, broke two aspels of an American reel, showing how necessary it is for the aspel to be strong enough to maintain the silk of uniform tension until perfectly dry. This reel will be used as a model for all others intended for the use of this filature, and variations in the others now on hand, will be changed so as to conform to that from Piedmont. We think the possession of the real Piedmontese reel, almost indispensable to all producers of raw silk. The art of reeling is not by any means so difficult as foreign writers assert. A girl who has any real desire to learn, can reel half a pound daily after a month's practice, and a whole pound at the end of another month. Females will be received at the model filature, and instructed in the art of reeling, without any other charge than the simple obligation to remain three months at the establishment; at the end of which time, if found competent, a certificate of their proficiency will be given to them by the directors.

Further particulars of our operations will be forwarded to you from time to time, if you consider the information desirable for your readers. M.

Philadelphia, May 4, 1840.

DIFFERENT SOILS IN KENTUCKY, AND THE CONJECTURED FORMATION OF THE RICH LANDS AROUND LEXINGTON.

From the Franklin Farmer.

The success of the agriculturist depends not only on industry, judicious rotation of crops, manuring, and the adaptation of the mode of cultivation to the nature of vegetables and their modes of growth, but *on the nature of the soil* and its consequent peculiar fitness for crops of one kind rather than of another. Hence, some knowledge of chemistry, mineralogy and geology, enables the tiller of the soil to derive greater resources from his capital and to avoid great disappointment in the investment of capital and in the cultivation of crops not suitable to the soil.

Some stock raisers of Bourbon and Clarke, raised on the *calcareous lands* of these counties, so finely adapted to grasses, (endogenous glumaceous plants, of which the *poa* tribe, including the greensward or blue grass is so valuable, and not the exogenous, leguminous plants, including the *trifolium pratense repens*, &c., red and white clover, which latter grow very well on *silicious soils* if rich,) who have bought lands in the *sandstone region* with the expectation of having fine grass pastures, will be greatly disappointed. They will find that the *silicious soil*, although rendered black and *apparently* as rich as the Bourbon land, by the decay of vegetable matter mingling with the iron washed down from the hills, *is not adapted to greensward pasturage*. They will succeed better with corn and clover, and still better with the mulberries for silk and the grape vines for wine. But for these branches of national industry they are not prepared. They would do well therefore to fix themselves on *calcareous lands*, and leave the sandstone lands to others. Until the mulberry and the vine shall become parts of our agricultural

system, the lands in the sandstone region will be most probably devoted to the raising of Indian corn, oats and leguminous crops. All these crops will, I presume, be easily disposed of in feeding hogs, and after a geological survey of this commonwealth, in supplying *iron smelters* and *colliers* and those connected with them, who will constitute a considerable population in that part of the state least favorable to agricultural purposes generally, and to graziers particularly. Although in speaking of Kentucky, we say it is a *limestone country*, this expression is to be taken with much limitation. The superficial stratum on which the farmer has to operate, in a large portion of the state, is not calcareous, and if the substratum is *limestone* it is overwhelmed by the detritus of sandstone and iron ore. It is true, that the limestone occasionally outcrops among the hills, but it does not give character to the soil. It is well known that the nature of the rocks of the country is a sure index of the nature of the soil in a great portion formed from them. By determining therefore, the lines of demarcation pursued by the superficial rocks, we have sure indications of the nature of the soil on the lands below them, *except on the alluvions of the streams.* On these we find the disintegrated materials of the lands from which they flow mingled with the stone and soil of the immediate neighborhood. Thus, on the alluvial bottoms of Licking and Kentucky rivers, we find the sand and fragments of sandstone, iron ore, shale, coal and conglomerate, carried down from the counties of Pike, Estill, Clay, Perry and Floyd, and deposited in the river bottoms in the counties below, in the soil essentially calcareous, carried from the neigboring lands. The alluvial bottoms, therefore, on the streams passing down from the mountainous country of sandstone, iron and coal, through calcareous lands, lower down, partake of the character of both regions, while the bottoms on the smaller streams, not extending into the highlands, are not of so mixed a consistence. With the exception of such alluvial lands, the lines of rock enable us to speak with sufficient precision of the nature of the soil. In passing from Frankfort, eastward, between Paris and Winchester, and in the direction of Mount Sterling, we find no rock *in place* but limestone, intersected by occasional veins of lead ore, and one, I think, of sulphate of barytes, until we get four or five miles east of Winchester. Here we arrive at the first range of sandstone, alternating with the limestone, and this range runs north-east and south-west across from the Kentucky river to Licking, very nearly parallel to the Cumberland mountain, where it constitutes the boundary of Harlan and Floyd counties. Whether it extends further than these streams, or changes its direction beyond them, I do not know from personal observation; at this line, commences a great change in the soil. Until we arrive at it, the soil may be considered essentially a calcareous and aluminous earth, enriched by decayed vegetable matter, and colored by oxide of iron. North-eastward and south-westward of this line, for a few miles, the soil is of a mixed character, gradually partaking less of lime, and more of sand, till the high hills begin to appear, then the change is complete, the limestone soil being overlaid and deeply covered by the debris from the sand and ironstone hills, which are flanked by mural escarpments and precipices of considerable height. These afford sublime and picturesque views to men, and places of retreat to bears and wolves. In these hills, are found beds of iron ore, and beneath them, stone coal outcropping in the ravines from beneath the shale and sandstone, and indicating their existence for miles below their position, by fragments carried down by the water. Here the blackberry, the hazle and the whortleberry, the ivy or calico-bush, and the *kalmia latiflora* usurp the possession of the earth, while the pine, the cedar, and the cypress invade the heavens above, and indicate a change of climate as well as of soil. They all combine to admonish the farmer to respect their natural rights, and wage no unequal war with them for the possession of the soil which would but poorly pay the expenses of the conquest. While to the miner, the mineralogist, and the florist, these hills and precipices and deep ravines offer the most attractive objects. To the state at large, there is no subject of greater interest, nor one which promises more useful results to her permanent prosperity, than a geological survey of her territory.

As to the causes which have produced that surpassingly beautiful and fertile *basin of land* lying between Licking and Kentucky rivers, of which the sandstone region above Winchester is the upper boundary, and the hills of Franklin, Owen, Grant, Scott and Harrison, the lower, we can only conjecture. It has received various names, such as the garden of Kentucky; the Elkhorn Paradise, &c. It is the "dark and bloody ground" for the possession of which, the Indians so long contended with the "Long Knives." It was well worth the winning. For a fairer land "the sun ne'er shone upon." Its central point of depression has never been ascertained, I believe, by surveyor, geologist or engineer. It is drained principally by North and South Elkhorn, which unite a few miles from Frankfort, and carry the superfluous water of this basin into Kentucky river. The soil is generally of a dark chocolate color, lighter or rather redder on the higher grounds and darker in the lower, except the mere superficies, which is very dark, in some places black. The causes we shall allude to hereafter. The rock of the substratum, at the distance of from three to ten feet below the surface, is blue limestone, in horizontal strata, imbedding numberless shells.

Still lower, we meet with harder limestone, capable of receiving a good polish, called "Kentucky marble," of which tombstones, &c. are made. The rock on the surface, and interposed among the soil, is apparently newly formed limestone, containing many shells and petrifactions. It is of a lighter color, and in much thinner layers than the blue limestone. Many specimens bear a strong analogy to the tufa or travertine of Italy. It is very friable, and its disintegration by rain and frost is very rapid. In descending hills and approaching the streams we meet with it throughout the whole basin. It forms steps and benches across the roads, rendering them bad for wheel carriages, and rough even to the traveller on horseback.

Of the forest trees, all of which have been enumerated and described by others, none in this region seem to be *very old*. There is no "cedar of Lebanon" among them. The sycamore or button wood, poplar, (*lyriodendron tulipfera*,) burr oak, walnut and ash, have attained the greatest size. As all of these are exogenous, consequent-

ly their age is easily ascertained, from the concentric rings indicating the growth of each year. I have examined some of these, apparently as old as any, and their age does not exceed three hundred and fifty years. In speaking of the soil, I should have mentioned that about five and a half miles below Winchester, there are a number of fragments of light sandstone, from the size of a man's hand to that of his head, and some larger still, and that throughout the whole basin, broken pieces of flint, from the size of a gun flint to that of an iron pound weight, are to be found on the hill sides and in the streams, on the surface and near it, and that what is called shot iron ore, is disseminated every where in the soil, and abounds most in low concavities where the soil is blackest. The nearest range of flint stone *in place*, that I have seen, is in Montgomery, beyond or eastward of Mount Sterling.

The relative situation of the high lands, east of this remarkable basin, of the rivers, on its flanks, of the hills below it, the appearance of its exterior edges on the upper side, denuded of soil and presenting an inclined rock-covered surface, with the stratified rocks of recent formation, and the rich deposit of soil having on and near its surface, fragments of the rock formation above, mingled with the soil, induce me to hazard a conjecture as to the former condition of this country.

If, as it has been supposed, the vast area between the Alleghany and the Rocky mountains was once an inland sea, which has been drained off by the rivers running into the Gulfs of Mexico and St. Lawrence, and the Lakes Superior, Michigan, Erie, &c. are *lower basins* of the same, not yet emptied by these channels, which, as their beds become lower by the attrition of the waters, will ultimately reach these remaining lakes, and drain off their waters, leaving their rich basins dry land, this operation may have been, and indeed must have been completed in regard to all the rich basins of land within that area which are now dry land. No person can, I think, visit the falls of Niagara, and examine the river and its banks, from the falls to Queenstown, without arriving at the conclusion that the falls were once at Queenstown, seven miles below the falls. An advance of the falls, twenty five miles up the river, will bring them to Lake Erie. That rapids similar to those now above the falls, will precede them in their advance towards the lake, will hardly be doubted, and that, therefore, the lake will not be suddenly, but gradually emptied. Indeed, the nature of the rock formation on the Niagara, leads to the formation of inclined planes first, by the passage of water over it. Limestone constitutes the bed of the stream overlaying the shale. This is softer than the limestone, and as it is washed out from beneath the lower edge of every break in the harder limestone, the latter, at its lower edge, is pressed down into the cavity below, while the upper portion of the same stratum rests upon the shale, as yet undisturbed by the action of the water. The bottom of a lake drained off, and remaining dry some three or four hundred years, in the position of the country around Lexington, between the Licking and Kentucky rivers, would present just such appearances as are actually presented. I therefore think that the Elkhorn Paradise was once the bottom of a lake of fresh water, holding a great quantity of lime in solution. That its waters, after producing, by deposition, the newly formed stratified rocks, and leaving on them the soil carried down from its borders, which, mingling with the vegetable matter grown since on this mud and the disintegrated limestone has formed so rich a soil, have passed off by the Licking and Kentucky rivers, cutting down their channels to the hard Kentucky marble. That in the passage of the waters from the east the fragments of sandstone and flint have been brought down into this basin from their places above, and that the minute particles of iron ore washed down, have given color to the soil, making it blackest where there is most vegetable matter; that some time must have elapsed, after the rupture of the vein of silex, in Montgomery, by the passage of the waters before the final draining of the lake, seems to be proved by deposites of limestone around fragments of flint. Some of these very soft limestones, encircling pieces of flint which jut out above the surface of the limestone, are two or three inches thick. Very few water-worn pebbles of quartz are to be found in this basin, except in the alluvions of Licking and Kentucky rivers. In the wide deposit of sand between Licking and Slate rivers, they are very abundant, and in the sandy talus westward of the mountains, in Estill county. That there are few pebbles, so little sand and sandstone here, I attribute to the high range of land running across from Kentucky river to Licking, which turned aside these rivers from the centre of the lake, and caused them to drain it by its flanks; the deep ravines leading laterally from it into Licking and Kentucky rivers, favor this supposition. I am told that the high range of land mentioned above, is at some points, (Owingsville for instance,) more than five hundred feet higher than the land at the mouth of Big Sandy river, on the Ohio. The admirable adaptation of the soil of this portion of Kentucky, to crops of grain, grass and hemp, is well known. It is thought by many experienced farmers to be *comparatively* cheap, even at its present prices, (from $50 to $80 per acre,) and certain it is, that after the exhaustion produced by many years' successive cultivation of the same crop, it recovers its original fertility with wonderful celery. The *return of vegetable matter to it* by clover, for a few years, or rye fed down on the land to stock turned on it when ripe, or even by covering it into timothy meadow, restores it to a condition suitable to crops requiring the richest lands to produce them. It is not to be wondered at then, that the Kentuckians occasionally overstock their markets with agricultural products much in demand. Those who own and cultivate farms in this basin, before they exchange them for other lands in Kentucky, or further westward, will act wisely not to depend on the *mere appearance of the soil*, but to ascertain its nature and composition before they buy. Otherwise, they may find it illy adapted to their purposes, and be much disappointed in the result of their operations.

JOHN LEWIS.

Llangollen, Franklin Co.,
August 29th, 1837.

ON SHOEING HORSES.

From the Franklin Farmer.

Nothing engenders so frightful a chain of diseases in a horse, all tending to disable him, as improper treatment of the animal's feet.—Nature had never taken greater pains to form an exquisite anatomical specimen of mechanical power than when it formed the foot of the horse; and to this beautiful, delicate, and complicated formation, does he owe his power of speed over most others of the brute creation. In a state of nature, the horse's foot is seldom, if ever, diseased; in a state of domesticity it is more or less unsound, in seven cases out of ten.—In a state of nature, the foot, being unencumbered by a shoe, is not prevented from assuming that position on the ground which keeps it in a sound condition, and enables each of its component parts to discharge their several functions. In a state of domesticity, the animal is obliged to wear a shoe, for the purpose of protecting its hoof from the roughness of harsh roads; and this shoe is generally so constructed as to inflict considerable injury upon the foot, by incapacitating its several component parts from performing their functions, thereby producing a state of disease. Contracted hoof, sand-cracks, thrush, grease, stiffness in the flexor tendon of the leg, weakness in the pastern and knee joints, and a tendency to genuflexion, are some among the various disturbances produced by improperly shoeing a horse, so as to impede any of the necessary actions of the foot. And yet most of the London farriers, totally ignorant of the anatomy of the horse's foot and of the various uses of its several parts, apply the shoe so as always to produce the effects we have just endeavored to describe.—Having often before observed that we nowhere find such bad horsemanship as in the London parks—we may here add, that whenever we see an awkward fellow gallop by, riding upon his curb, and allowing his snaffle rein to hang loosely up the horse's neck, we are sure, on further examination, to find the poor animal suffering from bad shoeing, ignorance in riding seems always the concomitant of ignorance in treatment of the horse; and he who takes no trouble to learn to do the former with the least possible inconvenience to the animal, will pay little or no attention to the latter.

One of the most important organs of the foot of a horse is that portion which every body knows under the designation of the frog. Upon the health of this organ depends that of the whole foot; and yet the ignorant farrier seems to have conceived so violent an antipathy to this frog, that he always endeavors to cut as much of it away as he possibly can, without actually wounding the animal; and as from the mode of shoeing generally adopted a great portion of the frog is often dried up and decayed, the blacksmith finds no great difficulty in paring it away to almost nothing. The consequence of this we shall endeavor to explain, by describing the use of the frog.

This organ is seated at the heel, just beneath the hoof, and behind its bars. It forms a sort of case for the end of the flexor tendon, which it covers like a bulb. It likewise secretes an unctuous liquor which serves to keep the horn of the hoof moist and to prevent it from cracking. The frog is also an elastic wedge, which contracts and expands with the hoof, and when this wedge receives its due pressure as the animal walks, it keeps the bars in their proper state of expansion and counteracts any tendency in the hoof to permanent contraction.—Thus, then, its functions are indispensable to keep the foot sound; for if it were destroyed, the bottom of the flexor tendon of the leg would be exposed to disease; again, if it did not secrete oil to keep the hoof moist, the latter would crack; as is often the case, lastly, if it were dried up and deprived of its elastic power, the foot would become permanently contracted, and the horse lame, which is a matter of very common occurrence.

Two things are evident from what we have just stated.—1. The secretion, elasticity, and mechanical action of the frog, are absolutely necessary to keep the foot of the horse in a sound state. 2. If, from improperly placing the shoe, or from any other cause, the frog should be deprived of the stimulus necessary to enable it to carry on its natural action, the foot must fall into a state of disease. With reference to this latter, from the position of the foot, and the resources provided by nature, it can occur but very seldom that any accidental cause deprives the frog of its power of action; and as it is an undoubted fact that the shoe, when improperly put on (as it is in seven cases out of ten) produces this effect, by raising the heel and preventing the frog from receiving the slightest pressure—and the necessary pressure can alone give the proper stimulus—it is reasonable to conclude that, in most cases of diseased feet in horses the diseased action is the effect of bad shoeing.

If the farrier would observe the horse in a state of nature,—if he would examine the yet unbroken, and consequently unshodden colt, he would find that the broad, circular foot presses fully on the ground, the frog receiving as the animal walks, at each elastic rebound caused by the play of the pastern, a slight pressure against the ground, which excites it, keeps it in healthy action, and indeed preserves the whole foot from disease. He would also perceive, after a more minute observation, not only is the frog an elastic body, but that the hoof itself, though a horny substance, is elastic, and that it contracts and expands by the action of the muscles of the sensible foot, of which it is only the case or covering, preserving it from injury, but yielding to all its impulses. He would then, if he were not a dolt reason upon what he had observed, and infer that for a horse to be sound upon its feet, it must walk in that exact position which nature designed for it; and that any deviation from that position is unnatural, and deprives the horse of a portion of his power. He would also think that nature, by placing the animal firmly on his heels, and not on the front edge of its hoof, as most horses stand when improperly shod, did so for some wise purpose, and that the slight blows given to the frog as the animal walked, were not without an object, and therefore ought to be continued even when the shoes were on,—unless, indeed he had the presumption, like the be-breeched and be-booted louts in London livery stables, to fancy that he new better than nature. He would at last conclude that the shoe ought to be made to fit the horse's foot, as shoes of Christian folks are made, not the foot pared and burned down to fit the shoe; and that in fitting

on the latter, idiosyncrasies (dear reader, excuse the term) must be as fully attended to as would be done by the fashionable boot-maker in Regent street, when taking account of bunnions and other peculiarities on the feet, of one of his fashionable customers.

Unhappily for the poor horses, there are but few observing farriers in London, for there are too many cockneys who ride in the park on their curb rein, and know nothing of the habits or comforts of the poor animal they bestride, to allow farriers time for improvement in their craft; and as we have before observed the oracular sayings of ignorant grooms being received in preference to the dicta of men of information, there is no encouragement held out to those who would otherwise devote their time and energies to the question.

It is much to be desired that a shoe were invented which should have the faculty of yielding to the different impressions which the hoof would impart to it through its elastic action, which action, however, is but slight. In applying a hard, unyielding iron shoe to a horny substance which gently contracts and expands during the action of walking, a degree of inconvenience must always be felt by the animal; but this inconvenience is greatly increased when the natural position of the foot is altered. It becomes, therefore, a matter of vital importance to the well-being of the animal that the shoe should be so formed and fastened on as to allow that action to continue unimpeded which nature has imparted to the horse's foot. For this purpose we offer the following directions, hoping that, as we have called the attention of our readers to the subject, they will give it their earnest attention.

The horse's foot being circular, and not oval, the shoe should be made in that form; or rather the hoof should be measured, and the shoe made exactly to correspond. An oval or eliptic foot is generally, nay, we may say always, diseased. It has assumed that shape in consequence of the contraction of the bars, brought on solely by a diseased state of the frog for want of pressure; and in no one instance of oval formed feet will the frogs be found healthy. The moment the foot is lifted from the ground, the smell indicates the diseased frog, though perhaps cockney equestrians consider this the natural perfume of the organ when in health.

The shoe should be as light as possible consistently with the labor the animal has to undergo. Before it is put on, the hoof should be pared away towards the heels, in such a manner that with the shoe the horse should stand with the frog close to the ground, as when in a state of nature; when the shoe is on, it should be filed away towards the heels, being left sufficiently thick to enable the frog in the natural position of the animal without a rider or burthen, just to clear the ground; so that when the horse bears its burthen or its rider, the frog of the shoed foot should receive the same pressure from the ground that it would do if the shoes were taken off and the animal turned loose. When a horse is shod according to the present system, besides the various diseases brought on by the want of the action of the frog, the animal walks upon *its toes*, (the expression cannot be misunderstood,) and the proper muscular action of the foot and leg is perverted. Hence many horses fall dead lame without the farrier being able to assign any cause for it, although he will talk dogmatically enough on the subject to confound those who know no better than himself.

HARVESTING OF CORN.

From the Franklin Farmer.

As the season is approaching in which the farmers will commence the securing the abundant crop of corn with which a bountiful Providence has blessed our country, it may be pertinent to the occasion to offer a few remarks upon the best mode of harvesting the crop.

Our Virginia ancestors, and those who think it wise to plant and cultivate and gather as our fathers have done, pursue the old method; about this time they gather the blades below the ears of corn—after they consider the corn to be ripe, they top the stalks and secure all of the fodder in stacks for winter use. In November they pull the corn and remove it to cribs, where it is husked out at leisure. This mode is rapidly yielding in the stock districts to that first introduced among the graziers on the south branch of the Potomac. The farmers in the northern and middle districts of Kentucky, and in the Scioto valley of Ohio, have generally adopted this latter mode; which is to cut the stalks, corn fodder and all, and place them in shocks commonly embracing 16 hills square.

I have seen the richest crops of many climates gathered, and there is no operation in husbandry so animating as that of cutting corn in the mode just mentioned. It is a most cheering prospect to see 20 acres of corn pass in one or two days to a condition in which it is prepared to keep in the field throughout the winter. This remark is predicated particularly upon the plan of riddling the squares, instead of cutting the whole square at once. It will readily occur to any observing mind, that as corn does not ripen with precise regularity, if the entire square is cut at once, some of the corn will mould and sometimes even the fodder will be affected, if the cutting shall be followed by warm or wet weather. To avoid this contingency some graziers commence with the process of riddling, that is, they select only such part of the 16 hills square as may be ripe—go through the field in this way and in 10 days complete the cutting of the square. By this process several important advantages are obtained—the greatest amount of fodder is secured, consistently with the paramount object of saving the corn, and a nucleus for the shock being formed by the first cutting in the square, the shock becomes settled and stands better during the winter. In the rich counties of Clarke and Bourbon, they sometimes cut half of the square on one side and then in ten days finish it. Whilst many graziers in Fayette, Lincoln and Shelby, prefer the process of riddling.

In the course of October and November, these shocks are shucked out, the corn placed in cribs and two of the shocks placed together, or one placed upon the ground and two others put around it.

It is the opinion of practical farmers, that the practice of cutting corn in this mode secures the greatest amount of corn and fodder with the least expense, and is decidedly an improvement on the old Virginia plan, more especially when applied to the feeding of cattle or mules. T.

DIRECTIONS FOR CLEARING LAND.

From the Encyclopædia Americana.

Take a view of all large trees, and see which way they may be felled for the greatest number of small trees to be felled along-side or on them. After felling the large trees, only lop down their limbs; but all such as are felled near them should be cut in suitable lengths for two men to roll and pile about the large trees, by which means they may be nearly all burned up, without cutting into lengths, or the expense of a strong team, to draw them together. 2d. Fell all the other trees parallel and cut them into suitable lengths; that they may be readily rolled together without a team, always cutting the largest trees first, that the smallest may be loose on the top, to feed the fires. 3d. On hill-sides, fell the timber in a level direction; then the logs will roll together; but if the trees are felled down hill, all the logs must be turned round before they can be rolled, and there will be stumps in the way. 4th. By following these directions, two men may readily heap and burn most of the timber, without requiring any team; and perhaps the brands and the remains of the log-heaps may all be wanted to burn up the old fallen trees. After proceeding as directed, the ground will be clear for a team and sled to draw the remains of the heaps where they may be wanted round the old logs. Never attempt either to chop or draw a large log, until the size and weight are reduced by fire. The more fire-heaps there are made on the clearing, the better, particularly about the old logs, where there is rotten wood. The best time of the year to fell the timber in a great measure depends on the season's being wet or dry. Most people prefer having it felled in the month of June, when the leaves are of full size. Then, by spreading the leaves and brush over the ground (for they should not be heaped,) if there should be a very dry time the next May, fire may be turned through it, and will burn the leaves, limbs and top of the ground; so that a very good crop of Indian corn and pumpkins may be raised among the logs by hoeing. After these crops come off, the land may be cleared and sowed late, with rye and timothy grass, or with oats and timothy in the spring. If what is called a *good burn* cannot be had in May, keep the fire out until some very dry time in July or August; then clear off the land, and sow wheat or rye and timothy, harrowing several times, both before and after sowing; for, after the fire has been over the ground, the sod of timothy should be introduced as soon as the other crops will admit, to prevent briers, alders, fire-cherries, &c. from springing up from such seeds as were not consumed by the fire. The timothy should stand four or five years, either for mowing or pasture, until the small roots of the forest trees are rotten; then it may be ploughed; and the best mode which I have observed is, to plough it very shallow in the autumn; in the spring, cross-plough it deeper, harrow it well, and it will produce a first rate crop of Indian corn and potatoes, and, the next season, the largest and best crop of flax that I have ever seen, and be in order to cultivate with any kinds of grain, or to lay down again with grass. These directions are to be understood as applying to what are generally called *beech lands*, and the chopping may be done any time in the winter, when the snow is not too deep to cut low stumps, as the leaves are then on the ground. By leaving the brush spread abroad, I have known such winter choppings to burn as well in a dry time in August as that which had been cut the summer before.

THE BEE-MOTH.

From the Franklin Farmer.

Mr. Editor.—Having had some experience in the management of bees for several years past during a part of which time my apiary has comprised twenty hives; and having been a close observer of the bee-moth ever since its first appearance in this vicinity, I am induced to present a few facts which I have obtained by close observation, and which may probably assist some of your readers in checking the ravages of these destructive insects.

During the past summer I have kept a number of the maggots and the flies under glass tumblers and small boxes for the purpose of particular observation, and now write with one of each before me.

The moths are butterflies or candle flies of a pale ashy color; and when full grown are about half an inch in length, with reddish backs, small sharp heads, short and delicate horns, and without a proboscis. Their wings are small and double, and when in a state of rest are kept close to the body. During the day they may be found sitting upon the retired parts of the outside of the hives, and may be easily taken with the fingers. About the dusk of evening and morning the females may be seen sitting with their wings extended, inviting the embraces of the males, while others are flitting to and fro, and occasionally one may be seen to dart with great velocity into the entrance of the hive. The bees will not pursue the moths on the wing, and the moths far outstrip them in flight on foot. The moths live about ten or twelve days, during which time I cannot perceive that they take any nourishment whatever. The only object of their existence seems to be to deposit their eggs, which are small, round and white, and of which I have seen ten dropped in rapid succession. For this purpose nature has most skilfully provided them with a *sort of proboscis* about the sixteenth of an inch in length, which is contracted and protruded from their tails, and vibrated with great velocity, as wasps or hornets do their stings, which it somewhat resembles. With this admirable apparatus the eggs are deposited in places which are inaccessible to the bees, or they would be destroyed by a thrifty and a spirited hive. As soon as the young maggot casts its shell, it envelopes itself in a web which is closely attached to the hive or stand, and which is impervious to the bees. These webs are enlarged as the maggots grow, and they grow fast and fatten kindly, no matter whether a poplar or pine plank, or honeycomb and its delicious sweets, are the elements upon which they subsist and weave their webs.

From one experiment I am *satisfied* that the maggots will attain their full size of half an inch in length, and the thickness of a large knitting needle, in the short space of eight days: but of this I can speak with greater certainty hereafter, as I now have two lots of eggs under observation.

The maggots have tough, jointed, white skins, and hard oval black heads. They crawl but slowly and rarely venture from under the protection of their webs; though they often pass, like moles, through the centre of a sheet of comb 10 or 15 inches in breadth, making a partial web over each cell in the route. Though the bees cannot, I believe, penetrate the hides of the maggots, either with their teeth or their stings, still they can fight them and carry them out of the hives; and this they will do, when the hive is thrifty and in good spirit. I have often seen a maggot straighten himself and crawl off, apparently unhurt, after having been fought by several bees for many minutes; and I have seen the moths run over the bees and escape out of sight by the time the bees had faced about ready to give them battle.

After a brief existence the maggot gathers his web close around him, becomes inactive, and gradually assumes a harder black shell, which it bursts and is again a fly in about twenty days.

I have been somewhat particular, thinking it important to know the habits and character of the insects, in order to know how to destroy them. I have tried in vain to disgust and drive them from the hive, by the use of turpentine, worm-wood, penny-royal, &c. I have tried confining the hive close to the stand, and plastering up all the crevices with quick lime, and I think the plan with tubes for entrance (which I first saw suggested in an eastern paper) might succeed, did it not require a nicety of material and a precision of construction, which are not within the reach of ordinary bee-masters. After losing two valuable hives by relying upon the closeness of the boxes, I abandoned the plan, and have since tried elevating them upon blocks with better success. The zeal of your esteemed correspondent, J. J. V., for his plan, has led him into an error of which a close look into a thrifty and spirited hive will convince him. He will see the comb surrounded and covered with such dense clusters of bees, as no fly could penetrate: and any moth would conclude that it was far easier, (saying nothing of danger) to lay its eggs in the lower and unguarded corners of the hive than in the more distinct and frequented parts. All my stands have been more or less infested this year, and two which were but partly raised from the stand have been entirely destroyed; and, from daily observation, I am satisfied that the moths invariably, at first, deposit their eggs in the lower parts of the hive, and chiefly, where it sits upon the stand; whence the webs are gradually extended until they reach the comb. The bees then soon relax their industry, lose their spirit, and commence to eat their honey, in which other bees unite, and which may be known by unusual quantities of excrement about the hive. The moths and the maggots are emboldened to greater intrusions; they boldly enter the inmost recesses of the hive, and soon the work of devastation is disgusting and complete. The bees, not having spirit to resent the intrusion, and not being able to prevent it, languish, die, or desert the stand.

In a future number, if you wish, I will give you an account of the plan I have practised during the present season, and which I think most susceptible of general practice and success. * * * *

According to promise, I will pursue this subject, with some apprehension lest your editorial note may have induced the belief that I was about to divulge some mysterious and sovereign specific, for the destruction of these hateful insects. So far from it, the plan, which I at present pursue, is exceedingly simple, and susceptible of universal application; and may not have been practised by me alone, or by me first. But as I tried many unsuccessful experiments, and lost many valuable bee stands, before I adopted this plan, and as it has been quite satisfactory thus far, and it is not generally practised, I cannot refuse to communicate it, according to your request.

A shed should be built with three sides closed tight, and with the other side open to the east, high enough, under the eve, to admit two bee-benches, one above the other, and broad enough to walk freely behind the stands, with a door in one end of the shed for persons to enter it. The boxes should be arranged upon these benches with their entrances outward, so that the bees will be under no temptation or inducement to come behind them.

The boxes should be 20 inches square in the clear, made of thick seasoned plank well put together, with tight joints. The bottom of the box, which sits upon the bench, should be bevelled, from the outside, to a sharp edge. Cross sticks should be put in the box, and notches made for the bees to enter, in the usual manner: and large holes should be bored in the top of the box, to be covered with a cap twelve inches square, bevelled as above, after the box shall be well filled. When the bees begin to work in the spring, the boxes must all be raised upon the blocks put under the corners, high enough to permit the bees to pass freely under them, but not high enough to admit mice. The blocks must be high enough for the box to sit upon them without rocking or slipping. A light, slim wooden paddle should be made, with a handle about eighteen inches in length, and with a short, thin, elastic blade, and should be kept always in the bee house. With this instrument in hand, the bee master must walk behind the benches, and tilt the boxes over from him, look into them and search for, and destroy with the paddle, any flies or maggots which may be found. The house being open only in the front, and the bees being accustomed to fly out only on that side, this operation may be performed with security and at leisure. Indeed it will be a pleasant place, which may be resorted to at any time day or night; and the bee manager, whether male or female, so far from finding it an unpleasant or perilous task, will find it an agreeable and profitable amusement, and will be so much interested with the bees as to visit them too often for the moths to make much progress before they are discovered and destroyed.

If you wish to take some honey, a cap may be removed at any time, an empty one put on the box, and you may retreat through the side door, without the least inconvenience to yourself or interruption to the other bees.

The blocks not only serve to prevent a lodging place for the maggots, but also prevent the bees from being mashed when the box is set down, after being inspected. Nails have been recommended instead of blocks, but the difficulty of inserting and removing them renders them objectionable.

There is no effectual virtue in the nails, or in the blocks, or in the manner or material for making the boxes; or in drugs or liquids to drive the

moths from the hive. *The boxes must be raised up and inspected frequently and carefully, and the moths and maggots killed with the paddle.* This will give but little trouble and much pleasure and profit too, if the bee house is constructed on this plan, and is conveniently situated, so that the bee master can often step in and spend a leisure moment in witnessing and assisting the labors of these his industrious and unhired servants.

For this sort of attention my bees have this year repaid me with over two hundred pounds of delicious honey, and with many new swarms. 'Tis true I have had to inspect them often and kill many moths; and have lost two stands by depending upon the blocks and bees too much and not using the paddle enough. Your friend,

R. W. S.

ON THE CULTIVATION OF FRUIT TREES.

From the Franklin Farmer.

Description of a method of cultivating peach trees, with a view to prevent their premature decay; confirmed by the experience of forty-five years, in Delaware state, and the western parts of Pennsylvania. By Thomas Coulter, Esq. of Bedford county, Pennsylvania.

The death of young peach trees is principally owing to planting, and pruning *the same stock*, which occasions it to be open and tender, with a rough bark, in consequence of which insects lodge and breed in it, and birds search after them, whereby wounds are made, and the gum exudes, and in a few years the tree is useless. To prevent this, transplant your trees as young as possible, if in the kernal it will be no check of growth. Plant them sixteen feet apart. Plough and harrow between them, for two years, without regard to wounding them, but avoid tearing them up by the roots. In the month of March or April, in the third year after transplanting, cut them all off by the ground, plough and harrow among them as before, but with great care, to avoid wounding or tearing them. Suffer all the sprouts or scions to grow, even if they should amount to half a dozen or more, they become bearing trees almost instantaneously, on account of the strength of the root. Allow no animals but hogs to enter your orchard, for fear of their wounding the shoots, as a substance drains away through the least wound, which is essential to the health of the tree, and the good quality of the fruit.

If the old stalk is cut away the third year after transplanting, no more shoots will come to maturity than the old stump can support and nourish, the remainder will die before they bear fruit, and may be cut away, taking care not to wound any other stalk. The sprouts when loaded with fruit will bend, and rest on the ground in every direction for many years, all of them being rooted as if they had been planted, their stock remaining tough, and their bark smooth, for twenty years and upwards. If any of the sprouts from the old stump should happen to split off and die, cut them away, they will be supplied from the ground by others, so that you may have trees from the same for 100 years, as I believe. I have now trees from one to thirty-six years old, all from the same stump. Young trees, formed in this manner, will bear fruit the second year; but this fruit will not ripen so early as the fruit on the older trees from the same stump. Three years after the trees are cut off, the shoots will be sufficiently large and bushy to shade the ground so as to prevent the growth of grass, that might injure the trees; therefore ploughing will be useless, and may be injurious by wounding them. It is also unnecessary to manure peach trees, the fruit of manured trees is always smaller and inferior to that of trees which are not manured. By manuring you make the peach tree larger, and apparently more flourishing, but its fruit will be of a bad kind, looking as green as the leaves, even when ripe, and later than that of trees which have not been manured. Peach trees never require a rich soil; the poorer the soil the better the fruit; a middling soil produces the most bountiful crop. The highest ground is the best for peach trees, and the north side of the hills the most desirable, as it retards vegetation, and prevents the destructive effects of late frosts, which occur in the month of April, in Pennsylvania. Convinced by long experience of the truth of these observations, the author wishes they may be published for public benefit, and has been informed, that Col. Luther Martin and another gentleman, in the lower part of Maryland, have adopted a similar plan with great advantage.

From the Southern Cabinet.

NOTES ON EUROPEAN AGRICULTURE. BY A CHARLESTONIAN.

The Grasses.

I stated in my first number, that in fine breeds of horses, horned cattle and sheep, suited to the different climates and pastures, Great Britain took the lead of the world. The abundant supply of milk, butter and cheese—her superior mutton, veal and beef—her wool and her unrivaled breeds of horses, are all dependent on the cultivation of various rich grasses—some of them natives, but the majority and the most valuable—exotics, now naturalized and adapted to the soil and climate by long cultivation. England, with her millions of inhabitants dependent on her commerce and manufactures, could not exist without her grains and grasses. With all her wealth, she would be ruined in two years, were she obliged to import her hay and corn, on which the dairy and meat markets are dependent. O'Connell, who seizes every opportunity to speak contemptuously of our country, said in parliament, two years ago, in reference to Americans importing grain from Europe for home consumption, that he had but a poor opinion of an agricultural country that was obliged to import its corn. The improved breeds of cattle in the western parts of Pennsylvania—in Ohio, Kentucky and the Opelousas country, are evidences of what may be effected by the cultivation of grasses. The cattle brought to the Charleston market from Kentucky, will bear a fair comparison with those of England; they are indeed the descendants of imported breeds, and I have noticed that they are yearly improving in form, size and weight. The oxen from Opelousas, in the south-western part of Louisiana, with im-

mense wide spreading horns, like those of the buffalo of Abyssinia, are said to be the descendants of inferior breeds from Mexico. They are now among the largest and finest in the world, and supply with excellent beef the markets of Louisiana, Mississippi and Arkansas. They are especially prized for the team—are used in ploughing, and are said to travel with ease in a wagon at the rate of four miles per hour. To the rich grasses abounding in Kentucky and the Opelousas, must be ascribed the improvement of these breeds of cattle. In Kentucky, the grasses are clover and timothy, or herd's grass, and several species of *panicum*, *poa*, *elymus*, and *digitaria;* the two first have been introduced, and the others are exotics. The grasses in the Opelousas I am not acquainted with; they are evidently natives, and as the climate where they flourish does not differ materially from that of Carolina and Georgia, it would be very important to introduce the seeds and cultivate them in our southern country.

Although it would always be advisable to make experiments on the native grasses of the country, as best adapted to the soil and climate, and affording the fairest prospect of success in their cultivation, yet it must be admitted, that nearly all of the most valuable fruits, grains and grasses, were not originally natives of the countries where they are now most succcessfully cultivated. The cereal grains and finest fruits were not originally natives even of Europe. The Irish potato is infinitely more productive in the Green Isle than in South America, its native country, where the largest specimens I have seen were not larger than a bean. The rice, sweet potato and cotton plants of Carolina, have a foreign origin; and the clover and timothy, which are more valuable to the northern and western states than all the gold mines in the world, were imported from the east.

It must be admitted, that the maritime districts of Carolina and Georgia, and we might safely include the middle country, and a great portion of Alabama, notwithstanding a fine climate and a moderately good soil, have in reality no pastures. Our crow-foot and crab grasses, although excellent food for cattle, are only annuals, and the fields which produce them require to be ploughed and manured, (a labor which is seldom submitted to;) our hot suns of summer dry the earth and parch up the grasses—little hay is made to feed the cattle through the winter, and they are left to seek a precarious subsistence among the cane-brakes, which, owing to clearings, fires, and other causes, are daily diminishing. Towards spring they remind us of the description Col. Crockett gave us of his neighbors' hunting dogs—"so poor that that they had to lean up against a tree to bark." To give them the pickings of the early brome grass, the woods are set on fire, and away go the flames, destroying the young timber and burning up the rich mould on the surface of the earth, which has been collecting for years—many a panel of fence is burnt up, and many a day is wasted in consequence of having summoned out all the hands on the plantation to light the fire. The grass springs up, it is true, but in that state affects the cattle unfavorably, weakening them by constant purgation, and about the time the cows become mothers they are found in the ditches or in the mire—the flight of the buzzard, and the dogs on the plantation indicating where our treasures lie hid. I should be happy of an assurance that this is an exaggerated picture of our grazing and farming system, yet whilst I see hay brought in bundles from New England to Charleston, and thence reshipped to Columbia and Camden—whilst I am constantly witnessing our poor and diminutive breed of cattle, and am doing penance on salt butter from New York and New Jersey, I cannot but think that we are sadly deficient in the cultivation of suitable grasses, on which all the prospects of the dairy, the beef market, and the improvement of our soil, depend. It would be fallacious reasoning to argue that our southern country cannot become a grazing country, because we have, as yet, found no native grasses adapted to this purpose. Great Britain was once a sterile country, dependent on its mountains and on its continental neighbors for its butter and meats; at present, with a population increased one hundred fold, it supplies the wants of its inhabitants, thousands of whom derive their whole subsistence from the products of the dairy. The island of Jamaica, which has no productive native grasses, and which formerly imported every pound of butter and beef, has been abundantly supplied with both, by the simple introduction of Guinea grass, a native of Africa. We have in Carolina been so infatuated with the cultivation of cotton and rice, that we have paid but little attention to our native grasses. There are several species that have been undervalued, and others are only known to the botanist. Our Gama grass, (*tripsacum dactylsides*,) may have been puffed too highly at one time, but appears now to have fallen below the standard of its real value. I have had a bed of it in my garden for the last ten years; it has never been affected either by our hottest summers or coldest winters—not a root of it has required transplanting, and it is at this moment, if possible, more flourishing than ever. Horses do not relish it in its green state, as it is a coarse grass, but readily eat it when made into hay. Cows and mules are fond of it, and thrive under it. The rice grass (*leersia oryzoides*) succeeds well in very wet soils, but the seeds are difficult to preserve. The hay is equal to that of timothy, but the plant is only adapted to particular kinds of soil, and in dry seasons is an uncertain crop. These grasses, as well as the white clover, are indigenous to our soil, and seeds and plants can be obtained in many portions of our state. We have upwards of two hundred species of grasses indigenous to our southern states, and it will not be presumptuous to say, that some of them may be found well adapted for pasturage and hay. No country has ever been known in which some kinds of grasses for pasturage and hay may not be cultivated with success. If the native grasses are not adapted to the purpose, those of similar kinds in other climates may be advantageously introduced. The plants of China and Japan are known to succeed well in our climate, those of Thibet, Persia, the island of the Mediterranean and Morocco, being in nearly the same latitude, as well as those of portions of South America and New Holland, might be introduced with a prospect of success, and it would be surprising if some among the various grasses that succeed well in these countries might not be equally well adapted to our own soil and climate.

But the cultivation of grasses is not alone es-

sential in affording pasturage and hay, and thereby adding to the comforts of life in providing us with milk, butter, and meats for our tables: they are very important aids in restoring exhausted soils. They are substitutes for manure. Our plantations in the south are so large that with all our industry in collecting leaves and stable manure, not one-half of our fields are ever manured. Hence, our lands in time become exhausted, are are thrown out as old fields, and not cultivated again for many years. Some of our planters remove to the west, believing it cheaper to clear new grounds than to restore exhausted ones. In the mean time, they and their families have to undergo many hardships and privations. They are thrown among strangers, severed from the associations of early life, and are deprived of the advantages of society—of schools and churches. Had the same labor been bestowed in renovating their now deserted plantations, that has been used in settling their new farms, they would probably have suffered nothing in fortune and gained much in comfort.

That land may be improved in cultivation without adding stable manure, has been shown by many successful experiments. I have seen lands in Pennsylvania and New York, which are now more productive than they were twenty years ago, and have been continually improving although under cultivation, without the addition of any other manure than the small quantities of plaster of Paris in which the wheat had been rolled previous to sowing. The wheat was succeeded by a crop of clover: this produced one or two plentiful crops of hay the first year, and was probably pastured the year following. Crops of Indian corn, or potatoes, buckwheat, oats, wheat and clover, succeeded each other: the farmer became every year more comfortable in his circumstances, and felt no desire to leave his kindred and native home in search of an El Dorado in the west.

In my next I will endeavor to enumerate some of the foreign grasses that might be cultivated in our southern country with a probability of success.

Providence has kindly scattered his blessings in due proportion over the earth. He has endowed man with intelligence and industry, to enable him to appropriate to his own use, the various productions in the wide field of nature from which he may derive subsistence and comfort. There is no country so sterile, which man by seizing on the productions around him, may not render subservient to his use, and from which he may not derive a support. The Arab in the desert, and the Esquimaux amidst the ices of the Pole, find a table prepared for them in the wilderness by the bountiful hand of heaven, and by seizing on their advantages, they are fed and clothed and are contented with their lot. The man in civilized society has many artificial wants, but is endowed with greater resources. Science and commerce enable him to bring to light the hidden resources of nature—to profit by the experience of others, and to bring into cultivation the productions of other lands. A beneficent Providence has created various cereal grains, fruits, and grasses, and planted them, perhaps, in some small island—on some obscure spot on this His earthly garden, but has endowed man with intelligence and enterprise to know their value—transplant them into other soils—improve these gifts of nature by cultivation, and render them invaluable auxiliaries to his comfort and happiness.

The most valuable plants and grains which now engage the industry and minister to the support of three-fourths of the world, are of comparatively recent introduction. Whilst the olive, the millet, and the silk, may be traced back to the ages of antiquity, the articles which now feed and clothe the inhabitants of the civilized world, have been more recently discovered by men of science, and brought into cultivation by the skilful agriculturist. A single generation has only passed away since a handful of rice, and a few seeds of cotton, were sown in a garden in Charleston as a *curious*, and no doubt, regarded by many, as an idle experiment. They are now such important staples, that they engage the commerce, and regulate, in a considerable degree, the monetary system of the world. The Irish potato, which has been of the greatest consequence to mankind, was not known in Europe till the days of Raleigh, and found its way into England by a ship, wrecked on the coast of Lancashire. During the many severe famines to which Great Britain has been subject, there is no exaggeration in asserting that the lives of millions of human beings have been preserved by this vegetable alone. It is but a little more than a century since the first coffee tree was brought to France, from which all the trees in the West-India islands have originated. The original sweet orange tree, from which all the varieties of that fine fruit in Europe and America have been derived, although a native of China, was shown but a few years ago at Lisbon. The writer of this article, has plucked fruit from the original tree, which produces the sickle pear now cultivated both in Europe and America, as the finest variety of this fruit in the world. The tree, he believes, is still growing in one of the meadows in the vicinity of Philadelphia. Nor is it in the power of any government, by its strictest enactments, to prevent the dissemination of fruits, plants, and seeds. If the ingenuity of man cannot accomplish it—the birds, the winds and the waves, will effect it. The cocoa-palm is now growing on the sands of Florida, the nut having been floated from Cuba by the waves of the sea. The sea grape, the shore plum, and more than a hundred other species of West-India plants, not omitting the mahogany, have been carried thither either by the winds or the birds. The white headed pigeon is known to visit Cuba every day, whilst it is breeding along the Florida coast, and thus becomes a courier and a planter between the island and main. The severity of the laws of that exclusive and extraordinary people the Chinese, could not prevent the productions of their soil from finding their way to other lands—nor could the rigor of the Dutch and the burning of their superfluous spice trees prevent the dispersion of their cherished aromatic plants. The tea shrub of China is now cultivated in Java by men smuggled from Japan, and also flourishes in the vicinity of Charleston—and the spice trees have found their way to the islands of the West-Indies and of the Pacific ocean.

The grasses cultivated in Europe, although the majority of them are not indigenous, have now become so thoroughly naturalized that they may be regarded as natives. In laying down lands for hay or pasture a greater mixture of seed is used than in the northern states of our own country.

The grasses most commonly cultivated are red clover, white clover, timothy or herds-grass, rye grass, crested dog's tail grass, vernal grass, trefoil, &c. To this may be added as fodder for cattle various species of vetch—as well as turnips, carrots, the sugar beet, &c. The invaluable herds-grass—our timothy (*Phleum pratense,*) was extensively cultivated in this country before its value was known in Europe, and has only of late come into repute in the latter country. I believe in America it received its name from having been brought from New-York to Carolina by Mr. Timothy Hanson. Less merit than this has often conferred immortality on a name.

A successful and extensive farmer in Scotland gave me the following list of grass seeds, and the quantities of each sown on an acre:

Red clover—the variety called Duke of Norfolk's cow-grass, (*Trifolium pratense.*) -	4 lbs.
White clover (*Trifolium Repens,*) -	7 "
Rye grass (*Lolium perenne,*) -	25 "
Trefoil (*Meticago lupulina,*) - -	4 "
Sheep's fescue grass (*Festuca ovina,*) -	½ "

In England the following table, contained in an article by Lawson on grasses, (Quarterly Journal of Agriculture, vol. iv.) exhibits the quantity of grass seeds sown to the acre. It will be recollected that the land thus laid down in grass is not intended as a permanent pasture, but to be used for hay and pasture for a year or two and then again cultivated with grain.—

LIGHT AND MEDIUM SOILS.

	One year hay.	*One year hay and one year pasture.*	*One year hay and 2 years pasture.*
Lolium perenne,	18 lbs.	18 lbs.	18 lbs.
Trifolium pratense,	8 "	6 "	3 "
" *perenne,*	00 "	00 "	3 "
" *repens,*	2 "	4 "	4 "
Medicago lupulina,	00 "	2 "	2 "

For heavy soils, 1 lb. of *phleum pratense* and 2 lbs. of *trifoliam pratense* are added.

The following table is added from the same author. It may be useful to our northern and up-country farmers, who may be desirous of laying down their lands for meadows or permanent pasturage. I believe this is the mode now generally approved in England.—

	LIGHT SOILS.		MEDIUM SOILS.		HEAVY SOILS.	
	With a crop.	*Without a crop.*	*With a crop.*	*Without a crop.*	*With a crop.*	*Without a crop.*
Alopecurus pratensis, - -	1 lb.	1½ lb.	1½ lb.	2 lbs.	2 lbs.	2 lbs.
Avena flavescens, - - -	½ "	½ "	00 "	00 "	00 "	00 "
Dactylis glomerata, - -	4 "	5 "	4 "	5 "	4 "	5 "
Festuca duriuscula, - - -	2 "	2 "	2 "	2 "	1 "	1 "
" *heterophylla,* - -	00 "	00 "	1 "	1 "	1 "	1 "
" *loliacea,* - - - -	00 "	00 "	00 "	00 "	1 "	2 "
" *pratensis,* - - -	1 "	2 "	2 "	3 "	2 "	3 "
" *rubra,* - - - -	2 "	2 "	00 "	00 "	00 "	00 "
Lolium perenne, - - -	10 "	12 "	10 "	12 "	10 "	12 "
Phleum pratense, - - -	00 "	00 "	1 "	1½ "	2 "	3 "
Poa pratensis, - - -	1 "	1 "	00 "	00 "	00 "	00 "
" *trivialis,* - - - -	00 "	00 "	2 "	2 "	2 "	3 "
Medicago lupulina, - -	1 "	1 "	1 "	1 "	1 "	1 "
Trifolium pratense perenne, - -	3 "	4 "	3 "	4 "	3 "	4 "
" *repens,* - - -	4 "	5 "	4 "	5 "	4 "	5 "
	29½ "	36 "	31½ "	38½ "	33 "	42 "

And common barley or rye, about one bushel additional to such as are sown without a crop.

In all cases the ground must be ploughed upon sowing the seed. It is scattered broad cast either in March or September, or October, (the autumn month being preferable,) and the ground is harrowed and rolled after sowing. In the northern states of America, clover is frequently sown in the wheat field in early spring, and this is occasionally done with the above mixture in Europe.

In England farmers differ considerably in their estimate of the various species of grass. In the pasturage on the South Downs, where the formations are of a chalky nature the plant called the Burnet (*Poterium sanguisorba,*) seems to cover the whole earth, and is greedily eaten by fine sheep that range on those pastures. This plant, which I have never seen in America, was formerly cultivated extensively in England for pasturage, but it has, of late years, given way to other more valued kinds. In the mountains of Switzerland, along the highways between Constance, Zurich and Berne, and indeed in the whole of the Swiss Alps I noticed the sheep and goats, and even cows, feeding almost exclusively on the rib grass, a species of plantain (*plantago lanceolata*) which I have occasionally seen in America, in the vicinity of cultivated fields, where it was evidently introduced. I was informed by the inhabitants that the fine flavor of their butter and cheese was imparted to them by this plant. The sweet scented vernal grass (*authoxantum alpinum,*) growing in the same vicinity, may also contribute its aid in this particular. On the hills of Scotland in the vicinity of Loch-Lomond, which, with the exception of their being not wooded, bear some resemblance to the mountains of Virginia, the common native grasses, such as the flat stalk meadow grass (*poa compressa,*) crested dog's tail grass (*cynosurus cristatus,*) *agrostis canina,* and several other hard species give nourishment to the extensive flocks covering the mountains. The duke of Buccleugh

is the lordly possessor of many of these extensive sheep walks. Thousands of black-faced sheep, the usual varieties of these towering hills, are annually driven to the markets in Edinburgh, Glasgow, &c. To my taste, they produce the finest mutton in Europe. I have often thought that not only these breeds of sheep, but the pastures on which they are fed, might be easily and successfully introduced into the mountainous districts of our country.

In Germany, the common spurry (*spergula arvensis,*) is cultivated as a winter pasture for sheep and cattle. It is sown on the stubble after the corn crops are removed. It is said that the mutton, as also the milk and butter of cows, fed on it, are of a very superior quality. There is a distinct variety of this plant, called the branching spurry (*spergula arvensis ramosus,*) which is now coming in general use. It comes earlier and is one-third more productive. I did not observe it in Great Britain, and the English farmers did not think it equal to many other grasses already in cultivation. It has been accidentally introduced into our country with our imported garden seeds, and is naturalized among some of the gardens on Charleston neck. I do not consider it of much value in our climate. It does not equal our wild peas (*vicia sativa* and *V. michelli.*)

In many portions of France I observed a very extensive cultivation of a grass resembling oats, called by the French, *l'Avoine elevée;* it is the *arrhenatherum avenaceum* of botanists. It is sometimes called *ray grass de France.* It has not, as far as I can recollect, been introduced into England, but I have heard Frenchmen praise it highly, even preferring it before our famed timothy grass. I have no doubt it would succeed in many parts of America. One of the earliest and best pasture grasses of Great Britain is the meadow fox-tail grass (*alopecurus pratensis.*) It is, however, better adapted to pasturage than hay, and requires two or three years after sowing to arrive at full maturity. But it is a perennial, seldom dies out in spots like many other grasses, and constitutes the greater portion of many of the richer pastures in Britain.

Until of late years the varieties of the common rye grass (*lodium perenne,*) were regarded in England as producing more grass and hay than any other species. They are still cultivated almost universally on lands which are expected to be converted into wheat fields after one or two years. Some of these varieties are annuals, others perennial. None of them remain, however, more than three or four years, when it is necessary to recultivate the ground.

At the present time the Italian rye grass (*Lolium Italicum,*) is regarded on the continent of Europe as the most productive of all the species. It is perennial; the leaves are broader, and it is said not to be affected by the vicissitudes of either heat or cold. I observed this superior grass growing in the neighborhood of Hamburg—in Prussia, Saxony, Austria, and France—and heard but one opinion, which was of the most favorable character. In the French periodical (*Le Cultivateur, Journal des Progrès Agricoles,*) it is spoken of by Mr. Boutteville, a very successful agriculturist, as one of the most valuable grasses in the world. He sows it with red clover among oats—ten pounds of rye grass to the acre.

He concludes by saying, "I can assure you that its hay is excellent for feeding horses and cattle; and that its nutritious qualities are greater in proportion to its weight than that of the other hays and clovers.

In England, where it has but recently come into notice, the accounts I heard of it were very favorable. The following statement from a respectable farmer, whose name I omitted to notice, I extracted from an agricultural paper:

"I cut on the 1st July, 1837, from ten Irish perches of inferior land, my Italian rye grass; the stalks were from four to four feet and a half long. Product at first cutting nine bushels of seed, which I sold at 10s. 6d. (sterling) per bushel. Second crop on the same year from six to seven bushels, and stalk from three to three feet and a half high. The hay was of the best quality. I expect another crop next spring."

Seeds of this grass may be easily obtained from Hamburg or Havre.

There is residing in the department of the Loire an eminent agriculturist, by the name of Bailley, who has originated a striking and permanent variety of rye grass, called Bailley's rye grass. I saw it growing on the mountains of Bohemia and in France. It was stated to me, that although shorter in growth, it was thicker and finer in foliage, more permanent in duration, and yielded fully as heavy a crop as the Italian rye grass. From this variety were produced six thousand pounds to the acre.

I shall conclude this article on the grasses with a few observations in reference to our culture of those species which I conceive well adapted to increase the products of the dairy and to improve our soils in regard to the rotation of crops, in the maritime districts of South Carolina and Georgia.

1. *The dairy.*—It is well known that Charleston, Savannah, Augusta, Columbia, and all our large towns in the south, are but scantily supplied either with good milk or fresh butter. A number of families in Charleston make a comfortable support by keeping four or five cows each, purchasing the grass which is brought from the country, and selling milk. When the cows become dry, they are sold to the butchers and others are purchased.

I would propose that the following experiment be made by some enterprising, industrious man, who is not ashamed of his profession, and will take a pride in attending personally to his business.

Let a farm of one hundred and fifty acres be procured in the vicinity, of from three to six miles of the city. Let this farm be divided into suitable lots for the cultivation of grasses and vegetables, to serve as food for the cattle. Let one field be planted in herds-grass, (*dactylus glomerata,*) which answers our climate very well, as I have had it flourishing in my garden for the last fifteen years, and have frequently cut it as early as February. I would prefer planting the roots, which are easily divided, setting them out a foot or eighteen inches apart. The seeds vegetate pretty well, but the plants when young are often destroyed by more luxuriant grasses. Let a small field be planted with the roots of the Gama grass. It is very productive; cattle, although they do not prefer it at first, soon grow fond of it, and they do not seem at any time to refuse it when made into hay. Let alternate fields of oats, barley and rye be sown *in drills,* and at the same time sowing

broad cast over some of these fields about twenty pounds of Italian or common rye grass to the acre. Another field should be devoted to the cultivation of the common Guinea grass, which, although it comes rather late in spring, is very productive, and lasts till killed by the frosts of autumn. A small bed left for seed, covered during winter with straw, will produce an abundance of plants, which should be set out in rows eighteen inches apart and the plant standing eight or ten inches in the row. Another field set out in the same manner with Egyptian millet, (*pennisetum typhoideum,*) one of the most productive grasses in the world, growing easily from the seed, and is thoroughly naturalized to our climate. Other fields I would have successively planted in vegetables, not for the market, but for the cows. These roots should be composed of turnips, ruta baga, kohl rabbi, sugar beets, carrots, &c. Thus an abundance of green food and vegetables would be successively furnished for every month in the year.

On this farm I would build extensive and airy, but not expensive stables, to secure the cattle against the cold of winter—and what is far more injurious, the heat of summer. The buildings should be so arranged that in summer the air may have a free circulation. Let forty or fifty cows among the best of the common breeds of Carolina be purchased; these may average about forty dollars per head. Keep among them a young bull of the superior English breeds. A stock may thus be provided in a few years adapted to our climate. Importations of grown cattle for our lower country are not advisable, as not one out of five survives two years, whereas those raised here do not seem to degenerate, and are as well adapted to our climate as the common variety.

Let the cows be housed all the year, and only be allowed to go out occasionally for exercise. Let their food be carried to them as in most parts of England, Belgium and Holland. They will be cooler in the stables than when exposed to the hot sun; our cows kept in confinement in Charleston thrive better than those that are turned out.

The manure and litter from the stables will, after the first year, go far to keep the land enriched.

Let careful attendants be provided for the cattle, and light carts used to convey the milk or fresh butter to market morning and evening. It is not my intention to estimate the profits of such an establishment, yet I cannot but think that it would be infinitely greater than that produced by any farmer in the vicinity of our city who has not invested a larger capital.

Should the above be regarded as a visionary scheme I would only ask not to be condemned before the experiment has been tried and failed.

2. *Grasses to be cultivated by the planter in the rotation of crops.*—My own experience will not allow me to pronounce positively on the best kind of grasses for hay or pasturage adapted to our southern climate as renovators of the soil.

The old method of cultivating the same field with cotton for a succession of years, and another with corn, until the lands are worn out, has been long tried, and the result has been destructive to the best interests of the planter. His lands are nearly worn out, and he has the prospect of leaving to his posterity a ruinous farm house, decayed fences, meager cattle, and a barren soil. It is a murderous system against which the earth cries aloud for forbearance, and which the voice of experience unhesitatingly condemns. Balaam's ass stopped to remonstrate when he was overworked. It is treating our kind and teeming mother with ingratitude and cruelty—demanding, like the Egyptian task masters, bricks without straw—labor without rest. We have been experimenting on the fable of the golden egg, and are now realizing the fruit of greedy desires. Oh! for another Mantuan bard to awaken us from indolence and error—who would instruct us with that gifted father of agriculture,—

"Alternis idem tonsas cessare novales,
Et segnem patiere situ durescere campum."

Whilst we are furnished with such large plantations, it seems hard that our poor cattle should be suffered to pick up a scanty subsistence and waste their manure in the woods. We have a sufficient number of productions already in cultivation to enable us to alternate our crops: cotton, corn, sweet and Irish potatoes, rye, wheat, barley, oats, ground-nuts, guinea corn, &c.—I need not speak of rice—the heavens have it in charge, and a thousand rills carry to it the drainings of the richest valleys. Even in this particular a benefit has, in some instances, been found in either suffering the rice land to rest for a year, or alternating the crop. A highly intelligent and successful planter of Waccamaw informed me, that he had two years ago not planted a portion of his land in rice, but suffered the volunteer, or red rice, to spring up. It was ploughed under; a portion of the land was cultivated in oats—the remainder was kept as a pasture for cattle. In this way his land was in a measure freed from red rice—he was bountifully supplied with milk and butter, and the product of his rice-field was on the succeeding year one-fourth more productive than formerly.

We have in Carolina several species of native grasses, that have already been brought into cultivation, especially the crab and crow foot. These, however, are annuals, and the ground requires to be every year cultivated and manured. The fox-tail grass, elymas or lime grass, and many species of poa, festuca, and panicum, are the native products of our fields. From some of these, and many others that I have not enumerated, a selection might be made as an experiment, which, in the end, could scarcely fail of success.

But I would prefer making use of those grasses that have been already found to be successful in agriculture. The clover and timothy I have reason to fear, are not adapted to our dry, sandy soil. On the various species of grasses cultivated in Europe, which I have already enumerated, especially those of the south of France and Austria, as well as Italy, no experiment has been made. I doubt whether the Italian rye grass has ever been seen in the southern states and scarcely in America, although I have a faint recollection of seeing a few plants, some years ago, on the farm of Judge Buel, near Albany in New-York. A crop of oats, or rye, after the corn or cotton, would afford a sufficient shade for the grasses to vegetate, and after the spring grain was removed, would not only afford hay or pasturage for cattle, but renovate the soil and prepare it for the production of our staple articles. By this means our land and our stock of cattle would be improved—we would be less dependent on strangers for our

hay, meats, and butter, and in the end our cotton and corn crops would be more abundant. It is but fair that we receive from our New-England brethren their cotton cloths in exchange for our raw material, and their flour for our rice, but it is rather a reflection on our industry and enterprise when we look to them also for our hay and butter.

RHODE ISLAND AGRICULTURE.

From the New England Farmer.

We have great pleasure in presenting the following account of his year's operations from one of the best farmers not in Rhode Island only, but in New England. Mr. Antony's farm does not embrace a large extent or variety of agricultural operations; but as far as it extends, it may be considered as pattern farming. Of his improvements we have spoken repeatedly before. They are skilful and beautiful, and do him the highest credit. We have only one wish in respect to him and his farm; and that is, that he was on this side of the line, that he might come in as a competitor for some of our noble state premiums. We know he has no low ambition; but an ambition to make any portion of this earth which heaven puts under our custody, as productive and beautiful as labor or skill or art can render it, is an ambition with which a generous and grateful mind may justly be satisfied. H. C.

Report of the farm of Wm. Rotch, Jr., North Providence, Rhode Island, under the management of Adam Antony; and considerably devoted to the sale of milk in the city of Providence.

Tillage	30	acres.
English mowing	18	‘
Pasture	26	‘
Wood	30	‘
	—	‘
Total	104	‘

Soil generally dry and sandy; some redeemed peat meadow; much of the land formerly covered with pine.

Live Stock.

Horse	1
Oxen	2
Cows	18

Amount of sales in 1839	$3294 85
Value of produce used or on hand	308 50
Labor in improvements charged to the owner	125 00
Incidental improvements on the farm, the lawful interest on which is added to the next year's rent	252 36
Cost of labor on the farm, including board	696 02
Incidental expenses	1394 04

Amount of Produce in 1839.

English hay, tons 50—average yield per acre			$2\frac{3}{4}$ tons.
Millet,	‘ 41	‘	$2\frac{3}{4}$ ‘
Indian corn, bush. 258	‘	‘	$64\frac{1}{2}$ bush.
Barley cut for fodder, tons 10		‘	$1\frac{3}{4}$ ton.
Potatoes, bush. 592	‘	‘	236 bush.
Turnips (French) bu. 500		‘	650 ‘
Swedish turnips, bushels 800			
Beef fatted, 9500 lbs.			
Pork, 556 “			
Corn fodder, tons 6			
Manure made, cords 100			
“ bought, ashes 1400 bushels.			

Notes by Mr. Antony.

Expenses of cultivating crops per acre—

Indian corn	$47
Oats	24
Barley	24
Potatoes	44
Ruta baga	47
Beets	53
Carrots	59
Hay, including getting, &c.	24
Millet	24

Average yield of a cow per annum, in milk, 593 gallons.

Beef animals fatted on hay, Indian meal, flax-seed oil meal, and vegetables.

Pork fatted on Indian meal and boiled potatoes.

Seven cords of manure were applied to an acre; and of ashes from 100 to 240 bushels.

Lime and gypsum have not been found useful.—Ashes are of great utility.

Ground oyster shells are, perhaps, good for nothing. No difference has been perceived in the effects of fresh or spent ashes. Potash, at the rate of 150 lbs. to the acre, has been found beneficial, and the same quantity of nitre. Have tried them, however, but one year, and know nothing of the permanency of either.

The most profitable articles of cultivation are considered millet and clover on light and sandy soils. On such as are of a better quality and firmer texture, the root culture is perhaps the most profitable.

Considerable hay and some vegetables are sold, but much the greater part of the produce is converted into beef and milk.

ESSEX AGRICULTURE.

From the New England Farmer.

The following account was received by us, but unfortunately was mislaid. It has not suffered by keeping; and will be read with much pleasure. It is a fair sample of New England farming; and shows a highly productive result. Very many are those who fall far below this product, over those who attain it, from the same number of acres.—Those whose imaginations and avarice are extended far beyond what is reasonable, see in such humble results as these, nothing to admire; but look with disdain upon such, in their opinion meager, returns. Yet it is by such a process and under circumstances thus restricted, that vast numbers in New England have found not only competence but independence; and have laid the foundation, indeed have carried up the superstructure of large and ample estates. H. C.

Mr. Colman—Sir—I have seen in one of the N. E. Farmers that you should like to have a statement of the produce of some of our farms. My farm is in Newberry, about one mile south of Newburyport. I have about 20 acres of good tillage

land, and about 15 acres of grass land too clayey for easy tillage. I have 30 acres of salt and black grass meadow: the remainder is pasture and woodland, containing in the whole about 110 acres —on which has been raised the present season 200 bushels of corn on about five acres, manured in the hill. I think that the storm of the 28th of August, destroyed one fifth of the crop. Six acres planted with potatoes, manured partly in hills and partly ploughed in, produced 1500 bushels. One acre and three quarters of onions, 740 bushels; one acre of winter rye, 26 bushels; three acres barley, 100 bushels; one acre of oats, 75 bushels one other acre cut for fodder, not thrashed. The oats were raised on pasture land never ploughed out once, and planted with potatoes the last year and manured in hills, this year harrowed, and 200 bushels of leached ashes spread on. I have 40 tons of English hay, cut the present season; 16 tons of black grass hay, 15 tons of salt and fresh hay, 60 barrels of winter apples, 11 barrels of cider, 40 bushels of beets and carrots, some pears, peaches, grapes and plums. I keep 1 horse, 4 oxen, 9 cows; calves sold 50 dollars; milk sold at the house 1500 gallons at 14 cents; and made some cheese in the hot weather. I have a son who takes the principal care of the farming. We hire two men seven months, at 17 and 18 dollars per month. We buy manure in Newburyport at $1 75 and $2 per load of half a cord or more; ashes 6 cents a bushel. I sell hay at $14 per ton. Onions are sold at 50 cents a bushel. Onion ground we manure with about 12 loads to the acre; plough it in the fall; about 15th of April plough it again and sow when the ground is fit. I sow in rows 16 inches apart, three pounds of seed to the acre; two pounds are enough if we were sure all would be right: I think if we have plenty of manure it is best to plough it in; if we have not a plenty, make the best of it and put it in the hills; then we shall not miss unless a very dry season. To cultivate an acre of onions on my ground, would cost about 25 days' labor.

Summary of the above.

No. of acres, 110

Products.—Indian corn, on 5 acres, 200 bushels.

Potatoes, 6 acres,	1500	bushels.
Onions, 1¾ acre,	740	'
Beets and carrots,	40	'
Winter rye, one acre,	26	'
Barley, 3 acres,	100	'
Oats, 1 acre,	75	'
English hay,	40	'
Black grass,	16	'
Salt and fresh hay,	15	'
Winter apples, barrels	60	'
Cider, '	11	'

Milk sold at the house at 14 cts. per gall., 1500 gallons.

Calves sold, 50 dollars.

I raise plenty of peas, beans, cabbages, turnips, squashes, &c.

I should like to find some machine to dig potatoes with oxen or horses.

November 28, 1839.

WIRE WORM.

From the Third Report of the Agriculture of Massachusetts.

Wheat, besides being subject to various diseases, has enemies to contend with among the insect tribes, which are formidable and often destructive. The wire worm is well known to farmers; and several cases of injury from his ravages are mentioned in the reports. These are principally found in lands which have been some time in grass, and newly broken up. On this account where they abound, to sow wheat on green-sward ploughed up, would not be advisable. A farmer in Williamstown, whose land was much infested with these worms, and whose corn crop always suffered severely from them when it was planted upon grass land newly broken up, found great advantages in ploughing his land in the fall, by which operation he thought many worms were destroyed by the frost; and then taking a crop of oats, which they were not likely to injure, before he took any other crop. This was followed by corn, and then by wheat. They are not disposed to stay in cultivated land, but prefer that which is in grass. Another farmer in Templeton, whose statements seemed entitled to confidence, is in the habit of getting some salt in the compost heap, with which he manured his corn. He says in this way his corn has escaped the depredations of the wire-worm, while his neighbors' corn over the fence would suffer severely. He has been accustomed to do this for several years, but could give me no definite rule as to the proportion of salt used in the heap. As well as I could gather from his statements, however, it was not large. To all soft-skinned worms, such as slugs, &c., the application of caustic or quick lime, if a small amount comes in contact with them, will prove destructive; but this does not seem to be the case with those which are encased in an armor of horn. The application of lime, therefore, in the hill with corn, is not found a preventive against the injury from the wire worm.

E. Phinney, of Lexington, whose authority is entitled to the highest respect, "advises in the ploughing of green sward to turn over in the spring, say from the first to the middle of May, after the grass shall have started a few inches. The reasons are, that generally a greater quantity of vegetable matter is turned under; the sod will turn over smoother in the spring than in the autumn, the grass is much less likely to spring up between the furrow slices, which materially injures the crop; and lastly, the worms which commonly abound in grass ground, are less likely to injure the crop. The reason must be obvious. Finding no green substance in land turned over in the fall to feed upon, they invariably seize upon the growing crop. Where the green sward has been thus turned over in the spring, after the grass has started, it is affirmed upon experience that injury from the worm does not occur, but when this is done in autumn, it is rarely otherwise."

N. Bennet, of Farmingham, thinks "turning over green sward in August, a perfect remedy for the corn or cut-worm, which is the wire-worm here referred to. By ploughing so early in the season, the grass has time to spring up and grow before winter between the furrows; and when he cross-ploughs in the spring, the young grass furnishes a sufficiency of food for the worms, and there-

fore the corn is not injured by them." Robert Colt, of Pittsfield, whose farming, as well as that of Mr. Bennet, has been honored with the premiums of the Massachusetts Agricultural Society, says "that he is satisfied from experience, years since, that the ploughing of green sward or stubble in the autumn, is a loss in the following crop of at least ten per cent. Sward lands, that are ploughed in the fall become compact during the winter; the finer parts washed between the furrow slice, excluding the air, and preventing the surplus water from draining off, consequently the turf lies heavy and dormant, with but little benefit to the crop. On the other hand, if ploughed in the spring, the soil is light and receives the harrow kindly; and the furrow slice does not become so compact as to prevent the circulation of the air, and allows the excess of water to take its proper course; and the sward, when the crop comes off, will be in a more forward state of decomposition than if ploughed the fall before."

These various opinions, coming from practical men of much intelligence and long experience, deserve attention. It would not answer to delay the sowing of wheat until the middle of May, as there would be great risk in our climate of its suffering from mildew. If wheat is to be sowed on green sward, it should be ploughed much earlier. But this would not in that case afford the protection against the wire-worm to which Mr. Phinney refers. I must dissent from the inference, (at least, I hold my judgment in suspense until I have farther light,) that this late spring ploughing is to be deferred on account of the superabundance of vegetable matter then to be turned under. Theory and experiment in this matter conflict with each other. I have been always inclined to the belief, which generally prevails, and which Mr. Phinney maintains, that the higher the state of luxuriance in which vegetable matter is turned in by the plough, the more the land will be enriched by it. But the experience of one of the best farmers in the state has satisfied me, especially as it had been confirmed by another equally intelligent farmer, and wholly unbiassed by the judgment of any other person, that the land is more benefited by the turning in of the clover after it is dried, than when in a state of greeness and full of sap. The opinion is, that if green it creates an acidity in the soil prejudicial to the succeeding crop. I do not know whether this theory be sound or not; but I have seen an experiment tried with a view to this point, in two adjoining lots of ground in the same field; and the result was conclusive in favor of turning in the crop when dried. Mr. Colt's opinion in favor of spring ploughing or against fall ploughing, bears on the same point. The conclusion, which seems to follow from these premises, is against sowing wheat upon green sward, on account of the wire worm. In such case, corn or oats then should be taken as a first crop; and corn may be taken, as Mr. Phinney advises, on a late ploughed sward, as the disadvantage, if there be any, in the comparison between turning in the herbage, in a green instead of a dried state, may be more than compensated by the protection which it furnishes against the worm; but if wheat is to be sowed, on green sward or stubble, on account of the results of Mr. Colt's experience, whether his notions be well or ill founded, it is to be advised to plough in the spring; but then as early as possible; because, as I am satisfied, of the expediency under all circumstances of sowing spring wheat as early as possible. In this case, the chances of the worm must be encountered, unless the mixture of salt with the compost, as mentioned above, may afford a security against him.

GATHERINGS FROM GRAVEYARDS, &c.

By G. A. Walker, Surgeon. Longman and Co., 1839.

From the Medico-Chirurgical Review.

The object of the present work is, to open the eyes of the public to the dangerous and disgusting results arising from the present practice of interments in the heart of cities, and in the midst of a dense population; and to endeavor to procure "the entire removal of the dead from the immediate proximity of the living." It cannot be denied that the present manner of burial has become a serious evil, and one well worthy of the attention of the government; but we are afraid that the custom, which originally arose from the credulous belief of the common people in the powers of the church over souls after death, inducing them to seek a grave in the immediate neighborhood of some place of worship as a protection against the enemy of mankind, is now too deeply rooted in the human mind to be easily eradicated.

Setting aside, however, the deleterious effects to the human frame from the pestiferous vapors continually exhaling from such enormous masses of putrefying remains, which must exercise a most baneful effect, especially on those living in the more immediate vicinity of these pest-holes,—we think that, if the public attention were to be once fully directed to the disgusting and monstrous practices continually resorted to with regard to the ashes of the dead, in order to make room for fresh supplies, they would be inclined to prefer a sepulture removed from the town, and in which they might rest in peace, to the present revolting practice of huddling up as many human bodies as can possibly be crammed into one narrow space in order that the proprietors of these places may reap as great a harvest as possible. Let us take, for example, one case detailed by our author: he is speaking of the burying-ground underneath Enon Chapel:—

"This space measures in length 59 feet 3 inches or thereabouts, and in width about 28 feet 8 inches so that its superficial contents do not exceed 1,700 square feet. Now, allowing for an adult body only twelve feet, and for the young, upon an average, six feet, and supposing an equal number of each to be there deposited, the medium space occupied by each would be nine feet: if, then, every inch of ground were occupied, not more than 189 (say 200 in round numbers) would be placed upon the surface; and admitting (an extravagant admission most certainly) that it were possible to place six tiers of coffins upon each other, the whole space could not contain more that 1,200; and yet it is stated with confidence, and by credible authority, that from 10,000 to 12,000 bodies have been deposited in this very space within the last sixteen years!" 237.

It is not long since an extreme sensation was

excited by the greatly exaggerated tales with regard to the practice of exhumation for the purposes of dissection, but we must say that none of these tales could at all equal the wholesale exposure and dismemberment of the dead which must here have been had recourse to.

* * * * * * * *

Having thus given an extremely slight sketch of the history of burial places, (for an exceedingly interesting description of which we must refer the reader to the book itself,) we will now follow the author in his description of the state of some of the

Burying-places of the metropolis.

Burying Ground, Portugal Street.—"The soil of this ground is saturated, absolutely saturated, with human putrescence. * * * The effluvia from this ground at certain periods are so offensive, that persons living in Clement's Lane are compelled to keep their windows closed; the walls even of the ground which adjoins the yards of those houses, are frequently seen reeking with fluid, which diffuses a most offensive smell." Typhus fever appears to be very prevalent in the neighborhood, especially in Clement's Lane, which is absolutely surrounded by burying-grounds.

Enon Chapel.—The upper part of this building is devoted to the purposes of public worship, underneath it is the burying-ground, being separated from it only by boarded floor. From ten to twelve thousand bodies have been placed here, since its establishment, in pits, the uppermost of which were covered only by a few inches of earth.

"Soon after interments were made, a peculiar long narrow black fly was observed to crawl out of many of the coffins; this insect, a product of the putrefaction of the bodies, was observed on the following season to be succeeded by another, which had the appearance of a common bug with wings."

A Sunday school is held in the chapel.

"Residents about this spot, in warm and damp weather have been much annoyed with a peculiarly disgusting smell; and occasionally, when the fire was lighted in a house abutting upon this building, an intolerable stench arose, which it was believed did not proceed from a drain. Vast numbers of rats infest the houses; and meat exposed to this atmosphere, after a few hours, becomes putrid." 156.

St. Clement's Church, Strand.—There is a vault under this church called the '*Rector's Vault*,' the descent into which is in the aisle of the church near the communion table, and when opened, the products of decomposition of animal matter are so powerful, that lighted candles, passed through the opening into the vault, are instantly extinguished; the men at different times employed, have not dared to descend into the vault until two or three days had elapsed after it had been opened, during which period the windows of the church also were opened to admit the perflation of air from the street to occupy the place of the gas emitted;—thus a diluted poison is given in exchange from the dead to the living in one of the most frequented throughfares of the metropolis. The other vaults underneath the church are also much crowded with dead. From some cause, at present doubtful, these vaults were discovered to be on fire* upwards of fifty years ago; they continued burning for some days, and many bodies were destroyed." 158.

There was formerly a well by the side of the church but the water became so nauseous that it could not be drunk, owing to its becoming impregnated with the putrefying matter with which the ground was charged.

Drury Lane Burying Ground.—The ground is now raised to a level with the first-floor windows, surrounding the place: in it have been deposited some thousands of bodies.

Whitechapel Church.—The burial-ground adjoining the church, placed, in the midst of a dense population, is so thickly crowded as to present one entire mass of human bones and putrefaction. "In digging a foundation for a new wall, the workmen penetrated through a mass of human bones eight or ten feet in thickness; these bones were thrown out and for some time lay exposed to public view, scattered over the ground in a loathsome humid state."—These were afterwards deposited in two or three pits which were filled up to within a few inches of the surface.

Bunhill Fields City Road.—In this burial ground occupying about seven acres, more than one hundred thousand interments are supposed to have taken place.

Mr. Walker has given a detailed account of many more of our metropolitan cemeteries; but we think that, from what we have furnished, the reader will be able to form a pretty accurate judgment of the remainder. We will, therefore, extract the account of only one more to show that this system is not confined to the poorer parts of the town, but extends even to the immediate vicinity of the palace.

"*Buckingham Chapel*, situated in Palace Street, about three minutes' walk from Buckingham Palace. There are two vaults and a burying-ground belonging to this chapel; one of the vaults is *underneath very large school-rooms for boys and girls*,* and the other is *underneath the chapel;* the entrance to these vaults, is through a trap-door, in the passage, dividing the school-rooms from the chapel; steps lead to the bottom of the building; on the right is the vault underneath the schools. When I visited this place a body had recently been interred, and the effluvium from it was particularly annoying. The vault is supported on wooden pillars, and there is only one grating which fronts the street, to admit light and air; the floors of the school-rooms, white washed on the under surface, form the roof or ceiling of the vault —it is no difficult matter to see the children in the lower school-room from this vault, *as there are apertures in the boards sufficiently large to admit the light from above.* This place is spacious, but very low;—the vault on the left under the chapel is about the same size as that under the schools, though much lower. I was assured that the ground was so full of bodies, that there was difficulty in allotting a grave; the roof of this vault is formed by the under surface of the floor of the chapel; it is white-washed, the light passes through it; the smell emitted from this place is very offensive. In the vault underneath the

* "This is not a very unusual circumstance; the vaults underneath St. James's Church, Jermyn Street, many years since, were on fire."

* "Some hundreds of children here receive their daily education."

chapel there are piles of bodies placed in lead; the upper ones are within a few inches of the wooden floor," 184.

We will not attempt to offer any comments on the facts which have here been detailed; they speak for themselves.

The remainder of the work is principally occupied by the consideration of the ill effects produced on the human constitution by these putrid exhalations; out of the immense number of cases brought forward by our author to prove their dangerous tendencies, we will select two only as illustrations of the results produced during the two most dangerous stages of animal decomposition, which he considers to be,—1st, that which takes place almost immediately after death, and the 2nd, during the extreme degree of putrefaction. As an instance of the evil consequences produced by the exhalation of the gases generated during the first stage, we may quote the following case.

"In the month of June, in the year 1825, a women died of typhus fever, in the upper part of the house, No. 17, White House Yard, Drury Lane; the body, which *was buried on the fourth day*, was brought down a narrow staircase; Lewis Swalthey, shoemaker, then living with his family on the second floor of this house, and now residing at No. 5, Prince's Street, Drury Lane, during the time the coffin was placed for a few minutes, in a transverse position, in the door-way of his room, in order that it might pass the more easily into the street, was sensible of a most disgusting odor, which escaped from the coffin. He complained almost immediately afterwards *of a peculiar coppery taste*, which he described as being situated at the base of the tongue and posterior part of the throat; in a few hours afterwards, he had at irregular intervals slight sensations of chilliness, which before the next sunset had merged into repeated shiverings of considerable intensity; that evening he was confined to his bed,—he passed through a most severe form of typhus fever; at the expiration of the third week he was removed to the fever hospital—he recovered; he had been in excellent health up to the instant when he was exposed to *this malaria*." 132.

The effects of the gases produced during the extreme state of putrefaction are illustrated by the following case.

"My pupil, Mr. J. H. Sutton, accompanied by an individual, for many years occasionally employed in the office of burying the dead, entered the vaults of St.——church; a coffin, *'cruelly bloated,'* as one of the grave-diggers expressed it, was chosen for the purpose of obtaining a portion of its gaseous contents. The body, placed upon the top of an immense number of others, had, by the date of the inscription on the plate, been buried upwards of eight years; the instant the small instrument employed had entered the coffin, a most horribly offensive gas issued forth in large quantities, Mr. S. who unfortunately respired a portion of this vapour, would have fallen but for the support afforded by a pillar in the vault; he was instantly seized with a suffocating difficulty of breathing (as though he had respired an atmosphere impregnated with sulphur); he had giddiness, extreme trembling, and postration of strength; in attempting to leave the vault, he fell from debility; upon reaching the external air, he had nausea, subsequently vomiting, accompanied with frequent flatulent eructations, highly fetid, and having the same character as the gas inspired. He reached home with difficulty, and was confined to his bed during seven days. The pulse which was scarcely to be recognised at the wrist,—although the heart beat so tumultuously, that its palpitations might be observed beneath the covering of the bed cloths,—ranged between one hundred and ten and one hundred and twenty-five per minute, during the first three days; for many days after this exposure, his gait was very vascillating." 133.

The remainder of the book is devoted to a general *resume* of the principal facts and observations contained in the preceding pages.

Having now completed our review of this work, it only remains for us to say that it will be found well worth the perusal of every person at all interested in the preservation of the health, decency, and cleanliness of the metropolis, and may, perhaps, prove not unacceptable to the general reader, as presenting a complete and curious history of the different modes of interment which have been resorted to among different nations, as well as for its novel description of the burial-places of London which we believe, have never, until now, formed the subject of any work.

In taking our final leave, we must, in justice to Mr. Walker, state, that the book is clearly and vividly written, and the author deserves great credit for the industry and zeal which he has displayed in his by no means agreeable researches among the graveyards; we hope, however, that he may reap a full reward for his labors, by seeing the disgusting nuisance against which he has declared war, at least mitigated, even if not altogether put a stop to.

EDGINGS FOR A FLOWER GARDEN.

From the Horticultural Journal.

For an edging, box is chiefly recommended. Box!--not always kept in order, and in such a case a harbor for vermin!—the most greedy and rapacious blook-sucker of every thing within its reach, the exhauster of the virtues of the richest compost. Next come thrift, bachelor's buttons, primroses, and even London pride, all tending to weeds, and all growing out of line: to avoid this, flower beds are often edged with board, which soon falls to decay. The best and most permanent edging I have ever met with is slate, set lengthways, three inches under, and three inches over the level of the alley or walk, the edges of the beds filled in the interior to the full height of the slate. I know an edging of this description made sixteen years ago, which is still in the highest perfection; at first, the outside of the slate was painted green, which gave a great neatness to the garden; soon after, an edging of gentianella was planted at the inside of the slate and close to it, which came into great beauty, and hung over the outside, forming an edging at top of three or four inches wide, requiring very little attention, and decorating the edges of the beds with a profusion of its large, rich, and graceful blue flowers, which, when lined by a single row of yellow crocus, ushers in the spring in the most vivid colors. A chief perfection of this edging is, that it is permanent.

POWERS OF THE ARAB HOSE.

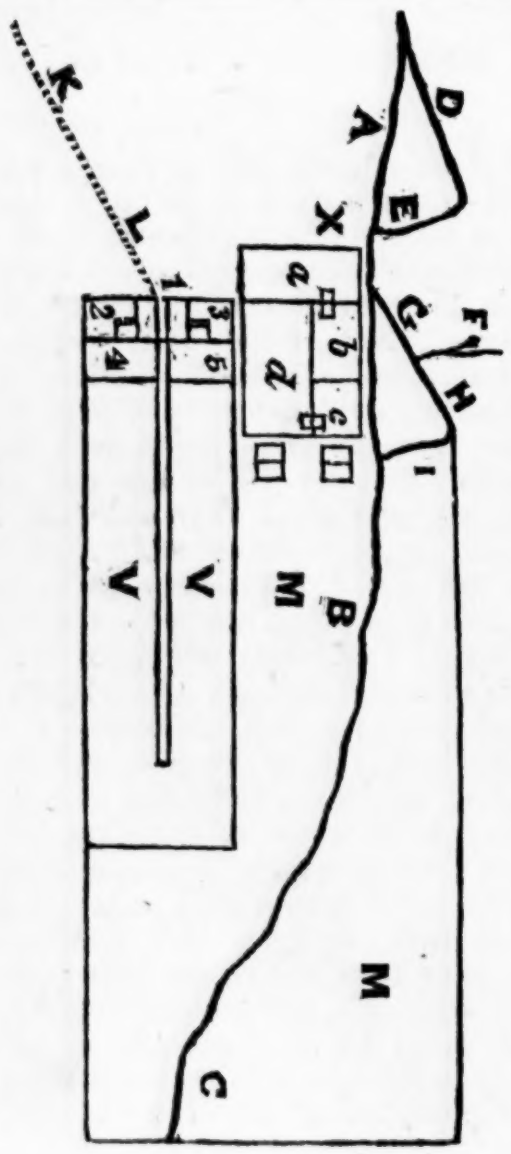
From Fraser's Tartar Journey.

I am tempted to mention to you one feat of an Arab horse, the property of a person who has more than once been mentioned by me in these letters, Aga Bahram, and which has not, so far as I know, been ever doubted. This animal came from Shirauz to Tehran, 520 miles, in six days; remained there three days, went back in five; remained at Shirauz nine, and returned again to Tehran in seven days. This gentleman told me that he had once rode another horse of his own from Tehran to Koom, twenty-four fursucks, or about eighty-four miles, between the dawn of a morning near the vernal equinox, and two hours before sunset—that is, in about ten hours. This, too, is good going: but Aga Bahram had always the best horses in Persia.

MANURING.

For the Farmers' Register.

Preface.—Although my name is not known in the communication headed, "Farm-Yard, &c." in February No. of the Register, page 126, yet I was mortified to find my horse and cow yards, and intended piggery, so illy represented by the cut. Mr. Ruffin has a multiplicity of business to call his attention, and the most important should claim his direct attention; consequently, in this matter, no apology is either wanted or required; nor should I have adverted to the subject had I not a desire to lay before the public my manuring operations; in doing which my yards will again be brought into view.*



* We are not yet aware of the ground of complaint against the correctness of the engraving. As reference to it would be necessary for the understanding of the present communication, no less than the former, the figure is again inserted, that it may speak for itself, as well as serve for explanation.—Ed F. R.

In the month of November last, I carted from horse yard *a*, 82, and from steer *d*, 160, in all, 242 heavy ox-loads of manure.

On the first of December, my steers and grown dry cattle were yarded in *d*, and having more pork hogs than usual, yards *b* and *c* and another were appropriated to their use, whilst the milk cows and calves were shamefully made to find their own shelters through the winter. On the first day of March, my cattle were turned from the yard, and two carts and ox-teams started to draw out the manure as follows:

From horse and cattle yards as above, for corn - - - - -	242
From cattle yard *d*, for corn - -	318
" horse yard *a*, do. - - -	92
" hog yard *b*, do. - -	82
" hog yard *c*, do. - - -	78
" hog yard additional, for corn -	66
" ox yard do. - -	30
Saw dust, chips and scrapings, for oats -	79
Waste straw and hay, on galls - -	42
From hog yard, for beets - -	11
600 bushels ashes saturated with marine salt at the rate of one per cent., for corn and cabbage, equal to - - -	120
	1160

Let it be remembered, that my milk cows and calves were not yarded through the winter, and that my steers and dry cattle were likewise not yarded during one-half of the feeding season. I wintered also 220 grown sheep, which were fed liberally with hay and cut oats, all of which feedings, of both cattle and sheep, and beeves, (which till this moment had been forgotten,) were on grounds requiring manure, and supposed to amount to at least - - - - 740

I am now ploughing down 25 acres of rye, and sowing millet and peas to be again ploughed down, equal to - - 500

Total manurings for 6 laborers one year 2400

My crop of rye is much injured by rust, (and so far as I can learn the disease prevails,) otherwise I should not have ploughed down so great a portion of the crop. I am pleased with the millet, both for hay and improvement. All my hogs at my place of residence are yarded this year, it being the first of my experience in this practice. They are littered with leaves from the woods, and green weeds and grass, which in part is their food.

The reservoir D, E, has been excavated, but I have not yet taken the time to remove the mould to my yards. If not deposited in the yards within a short time, it is intended to be spread on the meadow M, M, next winter, after which the meadow will be cut with the coulter, harrowed and rolled. The reservoir G, H, I, is also full and valuable.

The ashes mentioned, were mostly obtained from the burnings of timber on newly cleared land, every five bushels of which, with one per cent. of salt, I consider equal to a load of dung.

Last winter I made an effort at carting leaves into my yards, but the weather proved so unfavorable that I only got in about 100 loads. I have leaves in abundance, at the distance of six to eight hundred steps from my yards, and hope to hand Mr. Ruffin a good long tally next year. My oats

now growing on the oat fallow of last year, bid fair to yield thirty bushels to the acre; which is about double what the yield would have been last year, had they not been ploughed down. My harvested oats of last year yield about forty bushels the acre; a small portion of which I computed as high as sixty.

The first item in the above account, viz. 242 loads manure, was the remains of the accumulations of the previous year, but as I have now on hand more than this quantity, which is to be entered for next year, I suppose no objection can be raised to the entry.

I spread from 40 to 64 loads of manure to the acre, (average about 50)—that from the stables and hog yards, on clays; and that from the cattle yards, on loams and sands.

My sheep are never yarded, except the ewes and lambs in the severest winter weather; and for their accommodation I am now engaged in constructing a cot, and yard of about half an acre. From the yard, the manure will be moved about the middle of March; the ground being in artichokes, they are to be rooted out by hogs, from say 10th of November till 10th of December, when the yard is again ready for the ewes and lambs. This sheep yard, with other adjoining, is now in beets, but will be planted in the artichokes next spring; the artichokes being now growing in an adjacent field. I suppose the proper method of cultivating this crop is to drill, plough and hoe, the first year; but after having been rooted by hogs they need no further attention, except perhaps to pull out a few straggling weeds on vacant spots. The crops must be abundant on grounds thus highly manured.

My crop of corn is mostly on bottom grounds, and my ditches are already opened for the purpose of conveying a creek thereon so soon as the culture of the crop is completed.

MOUNTAINEER.

Amherst, June, 1840.

REMARKS ON CORN CULTURE—BEANS—GREEN-SWARD, ETC.

To the Editor of the Farmer's Register.

June 10*th*, 1840.

In your May number, I have read with more than ordinary interest, the appendix of the Rev. Henry Colman to Mr. Webster's agricultural address, which I had perused before; and the communication by Mr. Thomas B. Stevenson of Kentucky. There are, however, a few things in them to which I beg leave respectfully to state some objections. First, however, permit me to say a word or two of some of my own notions in regard to corn culture, which your correspondent S., of South Carolina, seems to have misunderstood, or I misunderstand him. For he appears to ascribe to me as a fixed opinion, what I offered merely as a conjecture, relative to the effect upon the crop of cutting corn-roots. The fact is, that this process which takes place more or less, in every mode of culture that I have ever yet witnessed, has always been to me a great mystery, and one of which I have never seen any satisfactory explanation. Between the various methods pursued by the most successful corn-makers, there is a vast difference in the extent to which the roots are cut; and yet fine crops are often found upon good land, under all their modes of culture, if the seasons have been favorable. This could not possibly happen, if cutting the roots was any thing like as injurious, as we have generally supposed. Two of the best corn-makers I ever knew cultivated altogether with the two-horse plough; yet their crops were certainly never inferior, as far as the eye could judge, to any others where a different process had been adopted. The fact is undeniable, and the only difficulty is, how to account for it. I believe, with your correspondent S., that, "if it were possible to avoid it," we should find it best "never to cut the root of any plant in its culture." But, is it possible? If it is, I cannot even imagine such possibility. No body, I believe, doubts that keeping the earth loose to a considerable depth, is absolutely necessary to the vigorous, healthful growth of all cultivated plants whatever. But the man who could do it without cutting many of the roots, would be very little, if at all, inferior to the famous artist John Emanuel Schoitz, described by Dr. Swift, who, among many other most marvellous feats enumerated by the dean, could "heat a bar of iron red hot, and thrust it into a barrel of gun-powder, before all the company, and yet it would not take fire."

Mr. Taylor's method is certainly a very good one, for he makes excellent crops; but it is pursued in its most important particulars by thousands. Still, there is unavoidably much root-cutting in it, and no greater crops are made by it, than by some different methods, where the lands are equally as fertile, and the proprietors equally as industrious, attentive and skilful, as Mr. Taylor. It has, however, one very great advantage over the old fashions, which prevailed some 30 or 40 years ago: it saves a great amount of labor, and is therefore far preferable, on this account, if on no other.

Suffer me now to state my few objections to the Rev. Mr. Colman's appendix, and to the communication of your South Carolina correspondent, S. In speaking of the bean, the first named gentleman says—"the varieties of the bean are two, garden and field beans, the white and the gray." Now, if Mr. Colman is *right*, all our botanical books are *wrong;* for they enumerate at least twenty species. Four of these are given in Bridgeman's gardening; and, of the *vicia faba* alone, he names twelve varieties, whilst he arranges under the other three species, twenty-seven varieties more, making 39 in all; and Loudon, in his "Encyclopædia of Plants," states about the same number. Mr. Colman, I presume, is too good a botanist to be ignorant of the facts, and, therefore, has been somewhat careless, (to say the least of it,) in limiting the number of varieties, even of the *vicia faba*, to two. It is a great departure from his usual particularity and correctness of description.

To a part of Mr. Stevenson's communication I object, on account of his giving, (as almost all the Kentucky farmers do,) the name "blue-grass," to the "green-sward," or "goose-grass," or "lawn-grass;" all of which names it bears. This is of a yellowish green, and cannot, therefore, with propriety, be called "blue," whereas, the true blue-grass is really of a bluish green, and hence it takes its name. It is very different from the "green-sward," in appearance; is more hardy,

and bears grazing far better, but it is more troublesome in cultivated lands. I have been led to these remarks from having experienced considerable inconvenience, as I have no doubt many others have, from the variety of names often given to the same plant. Let a few examples of this very troublesome practice suffice. The "red-top" is frequently called "herds-grass," and so is "timothy,' although they are as unlike as bottle-brush and rib-wort. The orchard-grass is also called cocks-foot, and the crab-grass crows-foot, whilst the lucerne, in some places, bears the name of French clover. When we come to mention noxious weeds, the confusion of names is still greater. Although I know of no sure remedy for this evil, we might certainly, I think, diminish it greatly, if we would take as much care in applying the common appellatives as in using the botanical terms; but this is never done. The neglect of this practice in a friend, who once sent me some pure cockle seed from London, under the very attractive name of "*rose campione*," actually betrayed me into sowing it very carefully in a rich spot of my garden; notwithstanding, I strongly suspected that it would turn out to be an old and very pestiferous acquaintance. I might mention many other similar annoying accidents, involving a loss of both time and labor; and I doubt not that several of your correspondents could add considerably to the list. But the foregoing remarks, I hope, will suffice to call their attention and yours to the subject in a way to produce some better remedial suggestion than my own. "In the multiplicity of counsel," our proverb says, "there is safety;" and if we brother farmers and planters would oftener volunteer to give it, we might remedy, in a great measure, the total neglect of our interests, by those whose duty it is, and whose special business it should be, to labor assiduously for their promotion.

No more at present, from your old friend and co-laborer, JAMES M. GARNETT.

NOTES OF NORTHERN SILK-CULTURE.

Extracted from the Third Agricultural Report, made by the Rev. HENRY COLMAN, Agricultural Commissioner of Massachusetts.

Amount of silk to an acre, and cost of production.—Questions of great importance come up here, respecting the amount of silk which may be produced upon an acre of ground, and the cost of production at the rates of labor existing among us. On these subjects conjectures abound; and calculations respecting the amount to be obtained so enormous and extravagant, that they are much better suited to form a chapter in the Arabian Nights' entertainment, than to enter into the thoughts of any sound mind. Conjectures, however, in matters of this kind, are not what we want; and it does not belong to me to present them to the farmers of Massachusetts. I have to lament, however, that few exact experiments in this case have been made in the country; and that many points, the decision of which, in my opinion, is more likely to have a favorable than an unfavorable influence upon the silk culture, remain to be determined. In my intercourse with the agricultural community, the mortifying conviction is continually forced upon me, of the very small number of persons, upon whose authority any strong reliance can be placed for that exactness of observation, which constitutes the first element of all true science, and all useful and practical information. It is said that in the map of the world in use among the Chinese, and to which they go to study geography, the empire of China occupies about two thirds of the whole surface. Too many of our farmers in their sketches of their own domains, and their own operations, are too prone to measure things by this Chinese scale. I shall have the pleasure, however, of referring to some authorities entitled to entire respect and confidence, to the extent to which they go.

1. Timothy Smith, of Amherst, who has had considerable experience in the production of silk, says in a letter to me, "I consider that one acre of white mulberry, set in hedge rows, will yield foliage for fifty pounds of silk; and presume to say that an acre of multicaulis (Perottet) will yield double the quantity to an acre of white. I consider that reeled silk cost me about two dollars per pound, not over; although it was a year of experiments; but feel confident that in two or three years, by using the best kinds of mulberry and the better economy, that silk can be made for one and a half dollar per pound."

In a subsequent letter, Mr. Smith remarks, "I consider the multicaulis the most tender variety of any that I have cultivated. I consider the Canton as my best mulberry tree for raising silk, taking into consideration the hardihood of the tree, and the quantity of foliage it yields. I like the Italian white; and think it best to cultivate some of each variety."

I understand Mr. Smith here to estimate, in the cost of the silk, the value of the labor only; and to charge nothing for the use of the land and the cost and care of the trees; nor any rent for his cocoonery. These items would add something to the cost of the silk, but it is not easy to calculate them, from the imperfect elements which are given. It will be seen in this case, that although Mr. Smith has had some experience in the production of silk, yet that his statements are somewhat conjectural. In his supposition, likewise, that he could obtain one hundred pounds of silk from an acre, planted with the Perottet mulberry, and that he hoped to reduce the cost of the production of reeled silk to one dollar and a half per lb., a little allowance is perhaps to be made for the quickness of pulse, which in that time of excitement was felt by every cultivator of mulberry trees in his visions of the profits of the multicaulis.

2. The next approach to the actual cost of the production, is presented by James Deane, M. D., of Greenfield, Mass. His admirable letter to me on the subject, I shall give in the appendix. He estimates the cost of producing reeled silk at from two to two dollars and a quarter per pound. He produced the last year several pounds of silk of as fine a description as could be made. When he undertook the culture of silk, he had never seen a silk worm nor a silk reel. He constructed a reel admirable for its simplicity and efficiency, of which I shall give an engraving; and his operations from the beginning to the end were crowned with perfect success. This demonstrates the great simplicity and feasibleness of the operation. Dr, Deane is so remarkable for his carefulness, that his

statements, where statements are given, may be implicitly relied on. The cost of producing the silk, however, is with him rather a matter of estimate or judgment, than of a careful observation of every minute charge; and, like Mr. Smith's, embraces only the labor applied.

3. The next authority to which I refer is that of D. V. McLean, of Freehold, Monm. Co., New Jersey. No experiment has been given to the country so numerous in its details and instructive in its results, as this. From the time employed and the wages paid for the production of twelve pounds of silk, he comes to the conclusion, that raw silk may be produced and reeled at the rate of two dollars to two dollars and one quarter per pound, though he admits, that "his cost him much more than this." This likewise is to be understood as the cost of the labor only applied to the production of the silk from the eggs; and without any allowance for land, trees, or cost or rent of cocoonery.

4. In Mansfield, Connecticut, it is customary with those who have trees, to furnish the eggs, to board the woman employed in the process, and to allow her half the produce in silk. She performs all the work, from the hatching of the worms to the reeling of the silk. The board of a woman in this case is estimated at one and a half dollar per week. I have no means of ascertaining how many worms a woman would be able to manage. The general estimate is, that one woman will feed 60,000 worms. It has been stated to me, that in one instance, one woman took the care of 120 000 worms; but I am unable to obtain the particulars of the case; and to learn whether she had any aid in picking the leaves or not. In the commencement of the feeding, the time of one woman would not be occupied entirely by an amount of worms, which at the close of the feeding season would require her whole and exclusive attention. Various circumstances, likewise, must come into the account; such, for example, as the facilities for feeding the worms; whether the leaves are to be gathered from high standard trees or from shrubs; and whether they are to be plucked from the white mulberry or the improved varieties. In the improved cocooneries small cars fixed upon a railroad are used to convey the leaves from one end of the room to the other; and at a great saving of labor and time. The use of hurdles, likewise, so as to facilitate the cleaning of the worms, will serve to lessen the labor. Practice and experience, as in all other cases, may be expected to bring with them their usual advantages. Under these circumstances, it is not easy to determine how large a family of these industrious and hungry operatives may be placed under the stewardship of one person. In Mr. Smith's operations, two women were occupied about five weeks in feeding the worms for the production of about twenty pounds of silk; but how long was required for the reeling is not stated. They received three dollars each per week, and board, which must be rated at one dollar and a half each per week. In Mr. McLean's experience, the labor of two women and a man twelve weeks each, would be required to attend upon one acre or 160,000 worms; and he estimates their expenses, including board, at three dollars per week each. These wages might be deemed ample for a woman's labor, but it is not more than half of the cost of man's labor in Massachusetts. Mr. McLean's cocoonery, which I had the pleasure of visiting, combines many advantages of construction; and his foliage was gathered from the Perottet mulberry, planted the same spring, and growing luxuriantly directly in the vicinity. His experiment, however, though conducted in a manner creditable to his remarkable intelligence and public spirit, cannot be said to determine in a satisfactory manner the cost of production; though I think it fully decides the question at the present prices of raw silk and of sewings, in favor of the profitableness of the culture, within reasonable limits; and at a fair value of land, labor, and trees. Any very great increase of production must of course be followed by a reduction of price.

5. Calculations made by John Fitch, of Mansfield, Connecticut, are as follows. I have not the pleasure of a personal knowledge of Mr. Fitch; but his reputation is a guaranty for the correctness of his statement. It is, as will appear, somewhat matter of judgment, but, I presume, founded upon experience.

One acre of full grown trees, set one and half rod apart, will produce forty pounds of silk.

The labor may be estimated as follows.

For the three first weeks after the worms are hatched, one woman who is acquainted with the business; or children, who would be equal to such a person.

For the next twelve or fourteen days, five hands, or what would be equal to five, if performed by children. In this period, two men with other help would be employed to better advantage, than all women and children. This period finishes the worms.

For picking off the balls, and reeling the silk, it will require about the same amount of labor, for the same length of time, as the last mentioned period, which may all be performed by women and children. The aforesaid labor and board may be estimated at eighty dollars; spinning the silk at thirty-four dollars; forty pounds of silk at the lowest cash price, is now worth two hundred dollars, which makes the following result:

40 lbs. of silk at $5 per lb. -			$200 00
Labor and Board, -	$80		
Spinning, - -	34	=	114 00
Net profit per acre, -			$64 00

The principal part of the labor may be performed by women and children; but where the business is carried on to a considerable extent, it is considered more profitable to employ some men for the last period of the worms.

This account of Mr. Fitch, it will be seen, makes no allowance for any capital invested in trees, land, or buildings; or for expenses which the care of the trees, land and buildings may require; and it refers only to the use of the white mulberry as standard trees.

6. The calculation of an intelligent silk-grower at Manchester, Connecticut, and who is a cultivator of the Perottet mulberry, is as follows. He estimates the value of the trees at 25 cents each, and he requires three thousand to stock an acre.

	Cost.
Of trees for an acre, - -	$750 00
Value of land - - - -	100 00
Capital invested, - - -	$850 00

Interest on 850 - - -	51 00
Labor in picking leaves, - -	25 00
Labor of feeding worms, and reeling silk, - - - - -	50 00
Extra manure for land, - -	20 00
	$146 00
Return.	
50 lbs. of silk $5 per lb. - -	250 00
Deduct charges, - - -	146 00
	$104 00

The labor here is undoubtedly underrated. The number of trees upon an acre, 3,000, is also underrated, unless upon the presumption that these trees are counted before they are laid down; if laid down in a furrow they would be multiplied many times. In Mr. McLean's case, there were 5,500 trees upon a quarter of an acre, or, 22,000 upon an acre. The price of silk is, in a considerable degree, capricious. The quantity produced upon an acre is matter of fair calculation. I do not rely with much confidence upon this statement; but I give this example for the sake of showing how difficult it is, even with observing men, to arrive at any certain results.

7. T. W. Shepard, of Northampton, fed worms to an amount not known, but supposed from 75,000 to 100,000. Commenced feeding about the middle of August; and the worms wound in about five weeks. The worms were of the two crop kind. About 2,150 lbs. of leaves were picked from small Alpine and white mulberry trees; all the leaves were stripped off with many of the small branches; and owing to the lateness of the season many leaves were very rusty. All the labor of picking leaves, tending the worms, and preparing bushes for winding, was performed by one man in five weeks, except paying a boy three dollars for picking leaves; and the first two weeks, the man was not engaged more than half the time. The cocoons measured twelve bushels; one bushel was saved for seed; and the remainder reeled by a young girl, totally ignorant of the business, having never reeled an ounce before. The amount of silk reeled was eight pounds. Under the most favorable aspect, the cost in this case, cannot be considered less than three dollars per lb. for labor only.

Product of an acre.—Of the yield to an acre, the most various calculations have been made. I should deem myself poorly occupied to go into the extravagances of some persons whose brains on this subject seem to have been turned, if in truth they had any brains to be turned; and should, in the present condition of the silk culture, deem it safe to rely only upon what has actually been accomplished.

Joseph Conant, of Mansfield, Connecticut, trained to the culture of silk from his childhood, and upon whose intelligent and calm judgment I should place much reliance, says, that an acre of land may be expected to produce from thirty to fifty pounds of silk. D. V. McLean obtained at the rate of 48 lbs.; or, allowing for waste and accident, at the rate of 50 lbs. to the acre. He adds, that he should utterly despair of obtaining 104 or 128 lbs. to an acre. Mr. McLean's product, under the circumstances of the case, may be regarded as a medium product; but how much more may be obtained it would be idle to state, until some exact experiments have determined this important point. I have before me various calculations of 100 lbs. 150 lbs. 167 lbs. 185 lbs. 333 lbs. 666 lbs., to an acre; but I have little sympathy in the hallucinations of those minds which prefer moonlight to clear sunshine. Fifty pounds of silk to an acre then affords the only safe basis on which at present we may make our calculations as to the profit of the business.

Quantity of leaves to a pound.—There are some other points connected with the culture of silk, to which it seems proper to refer. In all cases of this nature, well established facts are what we mainly seek after. When I speak of well established facts, it will be understood that I do not estimate testimony merely by the number of witnesses; for with respect to agricultural matters, as in other matters, a large portion of mankind in what they state only echo the sentiments of others, and they perhaps persons not very competent to teach; and are like parrots, who can utter only what they have heard others say.

It is often stated that one hundred pounds of leaves will feed worms which will make 1 lb. of silk. Aaron Clapp, of Hartford, states, that 80 lbs. of the Perottet mulberry leaves will do it, and this is asserted by many others. I do not learn from Mr. Clapp's conversation or his book, that this result has been reached by actual trial; but like the boy, who had learned his multiplication-table, when asked if he had been through his arithmetic, replied that he had been so far as to see through. The problem, however, has perhaps been more nearly solved by some others, and to their authority we shall defer.

Ralph Storrs, of Mansfield, Connecticut, states, that it requires 200 lbs. of the white mulberry leaves for one pound of silk. Joseph Conant of the same place, says, from 100 to 120 lbs. of leaves will make one pound of silk. I cannot reconcile the difference in the testimony of these two gentlemen, both of whom are experienced in the silk culture; but by supposing that they have never made an exact measurement in the case; or that the former in the weight of leaves included the weight of small branches or twigs, which were collected with the leaves.

I have, however, two testimonies, which rest upon exact measurement. Mr. McLean says, that the whole number of worms fed upon his quarter of an acre was 40,000. The weight of leaves consumed, 2,576 lbs. Amount of cocoons produced, 130 lbs., weighed just as taken from the shelves, without sorting or flossing. After they were sorted and flossed there was 1 lb. of floss and 4 lbs. defective cocoons, leaving 126 lbs. of cocoons. These produced 12 lbs. of merchantable reeled silk, 16 oz. to the lb., and 1 lb. wastage, ends, &c. From the above statement it will be seen, that it required between 19 and 20 lbs. of leaves to make 1 lb. of cocoons. Of these cocoons, without flossing or sorting, it required 10 lbs. and 10 oz. to make 1 lb. of reeled silk. After they were flossed and sorted, it required 10 lbs. and 5 oz., or about 214 to 215 lbs. of leaves, to make 1 lb. of reeled silk. These were the leaves of the Perottet mulberry. After making various allowances for waste leaves, Mr. McLean thinks it may require 190 lbs. of leaves to make 1 lb. of silk. The first statement is the result of an actual trial; the latter is matter of opinion.

Mr. Shepard, of Northamptom, in an experi-

ment made by himself, the last summer, found that it required 240 lbs. leaves and twigs of the Alpine and white mulberry to 1 lb. of silk. He adds, that had all the leaves been free from stem and rust, probably 200 lbs. would have been an ample supply for a pound of silk. These are the statements of a gentleman of perfect credibility, and the result of exact experiment. They are to be disproved only by more full, more exact, and repeated trials.

To his account Mr. McLean adds: "last year I produced at the rate of 510 lbs. of cocoons to the acre; this year I produced at the rate of 520 lbs.; and my deliberate opinion is, that more will fall below this standard than will exceed it; and in one case, where a less quantity of leaves will give the above quantity of silk, two cases will occur that will require a greater." The exactness, caution, and frankness of this gentleman are worthy of all praise.

Varieties of the worm.—Of the worms used for the production of silk, there are several varieties; some distinguished by a shorter or longer time in which they perform their work and pass the period of their existence; and others for the quality of the silk made from them. The sulphur cocoon makes a coarser thread than some other varieties. The six weeks' worm will yield the most silk. The three weeks' worm can be made to produce two crops, if they are carefully managed; if not particularly attended to they will require four weeks in which to complete their winding. The mammoth white require four weeks; and make two-thirds as much each time as the six weeks' worm. A new and beautiful variety, forming, from its being depressed in the middle, what is called the peanut cocoon, has been much approved, both from the beauty of the silk produced from it as well as from the little waste to which it is liable in winding, it running off in reeling almost without leaving any thing.

Quantity of cocoons for one pound of silk.—Of the number of cocoons required to weigh a pound, or the number required to produce a pound of silk, very different statements have been made. Cocoons are measured in Mansfield, Conn., by the bushel. The measures are evened, or as sometimes termed, struck, and four quarts additional are allowed to each bushel thus measured. The weight of a bushel of cocoons will vary from seven to nine pounds. The quantity of silk to be obtained from a bushel of cocoons will depend on the quality of the cocoons. The weight of cocoons will be affected by the time which has elapsed after the stifling of the moth or chrysalis.

With Mr. Smith, of Amherst, one bushel of peanut cocoons gave one and a half pound of reeled silk. Of the sulphur cocoons, one bushel produced one pound of reeled silk. This shows an extraordinary difference. Mr. Haskell, of Harvard, requires ten to twelve pounds of cocoons to make one pound of silk. With Mr. McLean it required 10 lbs. 10 oz. of cocoons without flossing or sorting, and 10 lbs. 5 oz. after they were flossed or sorted, to produce a pound of reeled silk. He found likewise, that it required 19 to 20 lbs. of leaves to make 1 lb. of cocoons. With Mr. Shepard 13 bushels of cocoons produced 9 lbs. of silk. In Mansfield it is considered a fair task for a girl to pick 60 lbs. of leaves per day; this, it is understood, is from standard trees. From trees in a hedge row, or accessible from the ground a very much larger amount can be gathered.

Natural and artificial management.—We may yet expect great improvements in the culture of silk. The method of culture to which I have referred is denominated the natural method. In Mansfield the fixtures are of the most simple character. A rough shed or barn is used for a cocoonery; and no provision is made for artificial heat beyond the closing of the window shutters in damp weather. It has been said that electricity will sometimes destroy the worms. Mr. McLean informed me that a heavy thunder storm occurred during his feeding, and the lightning struck in the immediate neighborhood of his cocoonery, but his worms experienced no injury. In Mansfield the worms are ordinarily cleaned three times in the course of feeding, and are fed three times a day. The Mansfieldans are of opinion that a cold is more favorable to the production of silk than a warm season.

By what is called the artificial process, pursued with extraordinary success at the experimental farm in France, under the direction of M. Camille de Beauvais and with the patronage of the government, the whole operation is much abridged in respect to time, and the quantity of silk produced from the same number of worms is considerably increased. The plan is to keep up an even temperature in the cocoonery as high as 75° Fahrenheit, and to feed the worms day and night to the full extent which they can be made to consume. I shall subjoin to this report a table most ingeniously drawn up, in which every step in the process is minutely and clearly detailed. This, in my opinion, will be almost invaluable to the cultivator of silk, as condensing, in a small compass, the most important and useful information.

The Messrs. Cheney, of Burlington, New Jersey, have experimented upon this artificial process, the last year, with success. The worms completed their winding in twenty-four days; and they have strong hopes to reduce the time required to twenty-two days. It is stated that, in proportion to the shortness of the time occupied in conducting the worm to maturity through the various stages, by incessant care, and the most liberal feeding, the quantity of silk is increased and its quality improved.

In the German pamphlet to which I have referred, it is stated that "by this mode of management, M. Beauvais has obtained from every half ounce of eggs, sixty-eight pounds of cocoons, whilst, in the south of France, they commonly obtained only twenty-five pounds, and in the north of Germany, with proper care, from forty to forty-five pounds." By this method, they can bring four generations of silk worms to spin in one year, and so have four silk harvests.

These are certainly great points to be attained. Such refinements in the cultivation, and so much pains-taking, may, by some, be regarded as discouraging; but they involve no mystery, and the extraordinary advantages to be obtained promise an ample compensation for much expense and labor. How far they may be suited to what may be strictly called household arrangements, or where the silk culture is pursued altogether as an incidental or subsidiary branch of husbandry, is a matter of easy calculation, and which any one may determine for himself.

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Reeling and reels.—The reeling of silk is not a difficult but a very nice operation. The objection to American silk has been in the imperfection or faults of the reeling. The perfection of reeled silk consists mainly in the evenness of the fibre. To effect this requires not only care but judgment. The worm in forming his cocoon, pours out the viscid matter from which the silk is made from his nose, and this becomes hardened in the air. At its first coming out it is in its largest form, and becomes gradually more attenuated as the worm becomes exhausted. The filament or thread from a cocoon is from 750 to 1150 feet long. Whatever number of cocoons are taken, to form a thread, it will be larger at first than it would be afterwards, unless care and judgment are used in uniting additional cocoons as the original fibre diminishes in size, in order to keep up the evenness and equality of the thread throughout. In doing this as it should be done, and in carefully uniting the filaments when by any accident they became broken, or are run off, consists the perfection of the art of reeling.

Various reels have been invented for the purpose of executing this work. I have seen three only in operation. The Piedmontese reel is universally admitted to combine simplicity of form with excellence of execution. Adam Brooks, of Scituate, Mass., has invented an ingenious reel by which the reeling and spinning are performed by one operation. It has much merit; but is liable to the objections, which usually apply to machines which attempt too much. In performing two operations it does neither of them so well, as if only one were undertaken at once. The third reel to which I refer, is one made by James Deane, M. D., of Greenfield, of which I have already spoken. It is beautiful from its simplicity and the perfect manner in which it executes its work; and it is likewise recommended by the smallness of its cost. We must not, however, expect to find any machine so complete as not to require a vigilant and intelligent superintendence. Even the human hand, that most perfect of all machines, can very poorly discharge its office without the light of the eye and the guidance of the judgment.

Domestic industry.—Mrs. Brooks, who claims some share in the Scituate reel, to which I have referred, has distinguished herself for her zeal and success in the culture of silk, in which for ten years she has been more or less engaged. She merits most justly a part of that brilliant eulogium, which the author of the Book of Proverbs has pronounced upon a good woman. I do not say that she has not just claims to the whole; but it is not within my province to adjust that account. "She layeth her hands to the spindle; her hands hold the distaff. She maketh herself covering of tapestry; and her clothing is silk and purple."* Mrs. Brooks has produced and completed from the egg three full grown patterns of silk; and considerable quantities of sewings. She surprised me by saying, that if her silk cloth could be sold for one dollar per yard, taking in the whole affair of production and manufacture, she could get one dollar per day for her labor. My surprise, mingled with some incredulity, has not wholly ceased. Her veracity is beyond question; but something must be allowed for the enthusiasm with which success has inspired her; and if there be no error, yet I fear there may be a little poetry in the calculation. It is almost universal since the introduction and extraordinary improvements of manufacturing machinery, to mourn over the decline of household industry properly so called; to speak of it as we are accustomed to speak of the existence of some ancient cities, as a thing that was, but which has now become purely matter of history; what our grandmothers performed with their own hands, as only suited to point the moral of some story in a winter evening; to consider it now not the province of women to make the clothes but to wear the clothes; and like other beautiful flowers, referred to in the sacred book, with which nature is adorned, though they may array themselves in the gorgeousness of regal magnificence to regard them as no longer doomed "to toil and to spin." The eminent industry of Mrs. Brooks and Miss Rapp will do something towards redeeming the character of our own country-women from a reproach but too often cast upon them by those who seek to find an apology for their own indolence, extravagance, and want of enterprise in the imagined and magnified deficiencies and faults of others.

Manufacture of silk.—It does not properly belong to my report to say much of the manufacture of silk, excepting so far as it is a household concern; and as a manufacturing establishment would afford to the farmers a market for their cocoons. In some places, this would be a great advantage. Several establishments for the manufacture of silk have been erected in Massachusetts and New England. Many manufacturing establishments in New England, some silk among others, have been undertaken upon too large a scale, and too far in anticipation of the actual wants or capacities of the community. Some of them being thus top-heavy have fallen by their own weight; and others have remained like the leaning tower of Pisè, the wonder of spectators, how they sustained their position. The extraordinary caprices of public affairs, and the embarrassments and fluctuations of the currency, and the explosions of many of the banks, which like the bursting of pieces of cannon, prove often most destructive to those who have the handling of them, and scatter their bleeding fragments in the air, have operated greatly against many manufacturing establishments among us.

The policy of the government has not been favorable to the production of silk, if an impost is to be considered as favorable. The removal of all duty upon silks, other than sewings, excepting a merely nominal duty of ten per cent. upon those from beyond the Cape of Good Hope, favors the cheap, ill-fed and unrequited labor of Europe and Asia; but it destroys all competition on our part. The imposition of the enormous duty of forty per cent. on sewings, which it was thought from its magnitude would amount to a virtual prohibition, in its large amount defeated its very object; for in an article embracing so large a value in so small a bulk, and so easy of being smuggled, it amounted, virtually, to a premium on its illicit introduction.

I had however the pleasure of visiting a manufactory of silk at Nantucket, on a small scale, but well conducted; and which it is thought will

* Prov. xxxi. vs. 19, 22.

demonstrate the practicability of manufacturing silk to a profit. The cost of the establishment in this place is about $15,000. It is calculated under full way, to manufacture 175 lbs. per week into sewings. It is understood that the investment in machinery should pay from nine to fifteen per cent.; that nine per cent. should be charged on the buildings; fifteen per cent. on all perishable articles; and six per cent. on the active stock. The cost of manufacturing, including all extra expenses, is estimated at $1 26 per lb.; or the manufacturer professes himself willing to take a lease of the establishment from the owner, paying as rent $2 per pound of the silk manufactured. The raw silk purchased from Smyrna, costs in Boston $1 28 per lb. cash; the manufactured silk sells for $8 10, and a credit of four months is allowed. What is technically called the weighting of silk, is increasing its weight by the dye-stuff, which is used. By the use of sumac, the weight is increased from 2 oz. to 3½ oz. per lb. It is said that abroad, a preparation of lead is often used with sewings, both to increase the weight of the silk, and render it more glossy and brilliant. I suppose this may be mentioned with safety, for certainly such an honest people as the Yankees will never think of adopting the tricks of the old countries. It is gratifying to be told that this establishment is expected to give a satisfactory remuneration both to its conductor and proprietor. Yet with these favorable prospects, it does not appear to me, that a sufficiently long trial has been had to determine the points at issue.

The account of J. H. Cobb, of Dedham, which appears to be made with exactness, gives a somewhat different result as to the cost of manufacturing sewing silk. He makes it, after detailing all the various processes, $2 55 per pound; and here no consideration is made for interest upon the stock, for superintendence, or for any commissions; and undoubtedly, as in all such cases, there are a great many incidentals, which must somewhat increase the cost. We believe this gentleman was soon satisfied that this manufacture could not be carried on to advantage.

With respect to the introduction silk manufactures, other than sewings into the country, as long as foreign fabrics are admitted free from Europe, and from China paying only a small duty, it must be despaired of as matter of profit. The silk manufacturers in Europe, if we except the worms themselves, are the poorest fed and the poorest paid of almost any class of manufacturing operatives on the continent. In 1834, the prices of labor for weaving galoons ⅜ wide, was one shilling one farthing sterling per groce; this would be a great day's work. At Huddersfield, where 13,000 persons, mostly females were employed, the wages averaged 2½*d.* per day. At Totmaston, where they worked 14 hours per day, men's labor was at one shilling sterling per day. In the county of Kent, 30,000 persons were employed in the silk-business, at 6*d.* per day. The prices, it is presumed, have not since advanced. In Lyons, the wages of men in the silk business is less than six shillings sterling per week, and of girls not more than three shillings per week. The salary of an overseer is about seventy-five cents per day. The wages in the silk districts in England, when the condition of the business is spoken of as prosperous, varies for an adult, from three shillings to eight shillings sterling per week; and as the article is matter of mere luxury, though of almost universal use, the fluctuations in their condition to which these poor creatures are subject, from the changes and caprices of fashion, often reduce them to extreme distress. We can easily suppose, that in some cases, they may wish they had the power of the humble insect, whose winding sheet they unravel, of enclosing themselves in a cocoon, from whence they might emerge with wings which should bear them away from their ill-requited toils and unpitied sufferings.

We cannot contemplate such facts without exulting with religious gratitude, in the superior compensation, and, in general, the extraordinary prosperity of labor, in our own country. But if we undertake the manufacture of silk, while trade is free, we must come in competition with such rates of labor. Is it to be supposed that we are ready for this? The benevolent mind would reluct at taking the bread from those mouths which get nothing, excepting bread, and scarcely enough of that, to keep their teeth bright, or their hearts from aching; especially when our country offers to those who will work, fields of labor far more favorable to health, comfort, competence and morals.

(*To be continued.*)

LIME AND LIME BURNING.

From Prof. Ducatel's Geological Report of 1839.

A very striking experiment, that speaks volumes of encouragement to those who still hesitate in the use of lime, is furnished by the Hon. Outerbridge Horsey, a part of whose farm, situated at the foot of the south mountain, on the edge of what is termed "the Maryland tract," consists of a very thin silicious soil. It is this, of two species of ground, both of the same geological character and nearly in equal arable condition, one was limed with fifty bushels to the acre, the other was well manured without lime, and both planted in corn. The limed portion, previous to the operations, was remarkably poor, yielding at most two barrels the acre. It promised in the month of August, to the eyes of some experienced farmers, to yield to the acre eight barrels of corn, which to all appearances was one third better than on the manured portion. But besides the prejudice that exists against this use of lime as regards the incapacity of certain soils to receive any benefit from it, it is most generally objected to as too expensive; whereas in truth it is, taking all circumstances together, the cheapest as well as the most effectual means of improving all kinds of soil, which assertion will, I trust, be manifest by these two considerations, namely, that it is the surest and most permanent. If judiciously employed, the directions being simple, as will presently appear, the expenditure of capital in the first year cannot fail to be at least repaid by the additional product of the next, and nine times out of ten will supply the means of extending its further use in future years. Judgment and reflection undoubtedly must accompany this as well as every other scheme of improvement that could possibly be devised for any purposes.

Having taken especial pains to inquire minutely into the subject, referring not only to the results

obtained by experience, but to the cause that may have produced these results, I hazard the following suggestions to the farmers of Frederick county, and the recommendation applies to all other portions of the state. Get lime, at almost any expense, and apply it according to the nature of the soil as is herewith directed. If the soil is naturally a good one, and under good cultivation, it is advisable to apply at once the whole quantity of lime which may be judged necessary permanently to improve it, and this quantity on such soils need not exceed one hundred and fifty bushels. Should it be impracticable or inconvenient to procure in the same year the whole quantity, from fifteen to seventy-five bushels may be first applied, and the remainder two years afterwards, after the first cutting of the clover. These directions apply to wheat land, on which it appears preferable to turn in the vegetable matter first, then apply the lime, to be harrowed in subsequently. On corn lands the method that has been crowned with the best success, is that pursued by one of the most thrifty farmers of Carroll county, Mr. Jacob Schriver, which is to mix the lime in the soil with stable manure. In this way, he informs me that he has obtained very heavy crops upon poor land, with only from forty to fifty bushels of lime. In general, for unimproved land, it is always better to turn the lime in with stable manure, and when not so provided, with any vegetable matter that may lie in the soil. A good plan is to turn the lime in with the sod, sow buckwheat, and when in blossom return it to the soil, furnishing in this way vegetable matter for the lime to act upon. In this latter case, the returns, though certain, are not so speedily to be expected. Those farmers who burn their own lime, should not neglect to use the refuse of their kilns in making composts with alternate layers of it, and of whatever vegetable or animal matter they can bring together. These, when properly mixed up, and comminuted, are to be used as ordinary manure. The foregoing directions apply to all sorts of soil, whether they be on limestone lands, red lands, chestnut lands, or any kind of lands, whatever be their color, texture, or other physical character, provided there be soil enough to support any sort of vegetation.

I have in former reports given my theory of the action of lime, and although farmers are more immediately interested in the results of its application, they cannot fail to employ it more judiciously, as well as other manures, when they understand the reciprocal action that takes place between these and the plants which they wish to cultivate. I shall therefore introduce here a few simple notions of vegetable physiology, and repeat again what I conceive to be the mode of operation of lime. Every one knows that plants have not the power of creating new elements, which they at most can assimilate and elaborate so as to form new compounds out of those derived from the earth, air and water in which they live. Accordingly, the result of a chemical analysis shows that all the earthy and saline matters contained in them are traceable to the earth; whilst by their destructive distillations, they are found to yield gases, that form the elementary constituents of air and water. The principal solid constituent of vegetables is carbon, or charcoal, which vegetable physiologists assert they derive in the first place from the carbonic acid gas of the atmosphere, and from the fermetation of the animal and vegetable substances that during their progress of decomposition in the soil also yield this gas, and is supposed to be either decomposed by the leaves of vegetables, or absorbed by their roots when in a state of aqueous solution. It is found that when a plant is allowed to grow under a glass receiver, containing a mixed atmosphere of carbonic acid gas and oxygen, the former gas is gradually absorbed, and nothing but pure oxygen remains, and this process of vegetable decomposition goes on more rapidly under the influence of the solar beams, for during the night the reverse takes place, though the quantity of carbonic gas which they emit is trifling, compared with that taken up in the day. Thus plants are constantly removing from the atmosphere a gas known to be deleterious to animal life, though necessary to themselves, and replacing it by one essential to both man and brutes, exhibiting a most admirable provision of nature, to which we must refer that healthfulness of a country life, which, combined with active exercise and the enjoyment of rural sports, makes the mere consciousness of existence a pleasurable sensation. It is also an admitted opinion among vegetable physiologists, that plants have the property of secreting from the soil that sort of food which is most congenial to their own wants, whilst they, at the same time, excrete, or throw off, that which is best suited for their own growths. If this doctrine could be well established by experimental results, the pursuit of the agriculturist would become a science founded upon an immutable basis, and a consistent system of rotation in crops would secure to him a perpetual recurrence of good crops. But it must be acknowledged that this is the most obscure department of vegetable physiology.

As to the action of lime, or rather carbonate of lime, I can conceive it to operate in three important ways. 1st, As a neutralizer of any acidity of the soil which renders it prone to throw out ascescent growths, such as sorrel, pines, briers, &c., that interfere with the production of plants that afford farinaceous seeds, in which case it may be supposed, by a new combination, to give out its carbon to the growing vegetable. 2d, As an amender of soils; since it undoubtedly contributes to stiffen a loose soil; and gives body and consistency to a porous and sandy one, thereby improving its physical condition. And, 3d, as a septic or decomposer of the vegetable matters that may have existed in, or been applied to a soil, reducing them into soluble compounds fitted to this nourishment of vegetable life. These I conceive to be the most immediate benefits derived from the application of lime; but it would seem to act also beneficially as an absorbent of moisture, for it has been found to protect soils from the pernicious effects of a drought, and when used for making compost, its utility and action are easily understood as explained. When applied in alternate layers, with stable manure, or vegetable manure, or vegetable and animal matters of any kind, a powerful fermentation takes place, which gives rise to the formation of a compound called ammonia, and to the production of carbonic acid. A reaction soon takes place between two substances, and a carbonate of ammonia is thus formed, together with numerous other salts; and the whole mass is converted into powerful manure. Lime is further serviceable to the farmer, by enabling him to

destroy the insects and the seeds of weeds that frequently accumulate in the barn yard manure; for by applying it in its caustic state in alternate layers with the manure, sufficient heat is generated to destroy them effectually; and this operation produces, moreover, a variety of soluble salts, that increase the action of the manure, if it be used before they have been removed by rain. There is another combination of lime which is very valuable to the agriculturist; it is that in which it exists in bones, that are principally composed of phosphate of lime. Most extraordinary results have been obtained by the use of ground bones as a top dressing, especially on buckwheat crops.

It follows from the above consideration, that it is a matter of much importance to the Maryland farmers, to obtain lime at as cheap a rate as possible. Desirous of serving them in this way, I have turned my attention to the subject of lime-burning; and after reflecting upon the theory of the operation, and consulting the practice of the most experienced lime-burners in the state, I think I am enabled to give some simple directions, the observance of which will have the desired effect.

In the first place, as regards the construction of the kiln, I recommended that it should be in the shape of a truncated egg at both extremities, with the but-end downwards, contracting the upper extremity, so as to make it act in the manner of a reverberatory furnace. Its shape should be very symmetrical, with a view of securing a uniform draft in all parts; and it should be built with solidity, of the most refractory material, with an elevation of about twenty-two feet, and a bulge at its greatest diameter of eleven feet. A kiln of the size will burn from 1,000 to 1,200 bushels of lime.

Next in conducting the operation, which, according to the present practice, lasts at the least three days and three nights, all lime-burners agree that on the morning of the third day, their kilns become choked up by something which prevents the formation of fresh lime, and during the whole of which they are burning wood apparently to no purpose. The cause of this choking, when the kiln, in popular language, is said by some to be "sot," and by others "glued," is owing to the accumulation of that peculiar gas which it is the object of the burning to separate from the lime, in order to bring it into a pulverulent state. This carbonic acid gas, as it is termed, is very heavy, so that where it has thus accumulated, it forms a dense atmosphere, binding round each unburnt portion of stone, and thereby impeding the progress of its calcination. It is true that by urging the fire, the gas finally becomes so rarefied as to be expelled; but this is the unprofitable part of the labor, which may be avoided by simply throwing some water over the kiln. The water immediately absorbs the gas, the kiln is relieved, and the calcination proceeds as rapidly as in the first stages of the progress. In corroboration of this view, I have found that it agrees with the experience of several observant lime-burners, one of whom informed me, that on an occasion, when his kiln was in the condition above described, his hands becoming impatient at the delay of their expected results, bethought themselves of ascending to the top of the kiln and fanning it with their hats, and were surprised to find their operations, by this simple act, greatly hastened. The effect was evidently, in this case, to remove by ventilation the dense atmosphere of gas, as previously stated, that by its pressure prevented calcination of the lime-stone. Another tells me that, under similar circumstances, the same phenomenon was produced by the timely occurrence of a shower of rain.

If our lime-burners then will adopt the plan of kiln described above, and resort to the simple device just suggested for expediting their operations, I have not the least doubt that they will find in it a saving of one third of their time, labor and fuel; and by so doing they will be enabled to afford this most invaluable material at one third less than its present cost, putting it thus within the means of a much greater number of farmers, to reap the benefits to be derived from its use.

THE EARLIEST NOTICES OF SILK CULTURE OF THIS SEASON.

It is yet too early to know much of successful operations in rearing silk-worms this season, because few such are yet fully completed and the results ascertained, and none on a large scale. But it is not too soon to have heard of many disasters and losses, and even of total failures of rearings attempted with insufficient preparation and means. Scarcely one experimenter in twenty has been properly provided to guard against the usual changes of weather and usual degree of inclemency; and much less so in regard to this season, which, to this date, (June 17th,) has been generally very unfavorable to silk culture, owing to the predominance of either cold or rainy, or cloudy and damp weather. Indeed, the weather of the months so far have been almost reversed, or each month having the weather that properly belonged to the next preceding or suceeding. In February, the weather was warm and clear enough for the usual warm parts of March; and the young multicaulis trees generally were in leaf in the tide water region some weeks before the usual time. In March these first leaves were generally killed, and there was severe frost, and ice. In part of April there was very warm weather, which either caused too early hatching of silk-worms' eggs, where not safely and properly retarded in ice houses, or invited new experimenters to hatch out their main broods, as for settled warm weather. Again, in May more than two-thirds of all the days were either cold, cloudy, showery, or of settled rain. Even in June, so far, with some very warm days, there have been several others requiring fires for comfort.

Every person who has had the slightest experience of the rearing of silk-worms must know that it is necessary to be able to protect them from cold, and still more from dampness of the atmosphere. And even should they be able to with-

stand much exposure, and yet be healthy and productive in spite of all neglect and ill treatment, that it is true economy to use effectual means to shut out damp air, and, in bad weather, to dry, warm, and renew the air of the feeding apartment, by using a little fire in a fire place, or a stove. Yet almost all have neglected to observe these necessary conditions of success, and therefore it is not to be wondered at that all such feeders have met with either partial or total failure in broods hatched in April, or the first days of May. On the other hand, we have heard of no person who had a close feeding house, and yet well ventilated, and who used fire in the worst weather, who has not so far done well, excepting in some partial cases of the use of bad eggs, or some other well known and sufficient cause of failure. If every person who has attempted and failed to raise a healthy brood this season were separately examined as to the causes, there is no question that in every case there would be found to have operated one or more of the following insuperable obstacles to full success; viz., eggs from unhealthy stock—early hatching and exposure to the cold and dampness and frequent and violent changes of the weather—wet food given during wet weather and on damp litter--or too close crowding of the worms, and neglect of cleaning away their litter. Yet there will be some persons who have permitted *all* of these evils to operate, and who nevertheless are astonished at their failure, and totally discouraged from making new and better directed efforts.

Many experimenters also who have acted more judiciously, and still more of those who have been too fearful of failure to commence any experiment, will be discouraged by the number of these losses. But there is no ground for such a conclusion. It is certain that this business is capable of being reduced to precise regulation, and conducted always in the same manner. If, then, there were a far greater disproportion of failures compared to successful rearings this season, it would furnish no argument against the business as properly conducted, provided there were *any* well conducted and certainly successful experiments made in the same unpropitious season. If indeed but one person were to be undoubtedly successful, and 500 others were as certainly unsuccessful, it would be clear that all these might have done as well as the one, if they had but used equal care, and pursued the same method.

Having suffered in one, as well as having heard of sundry other cases of such early disasters, we were desirous of seeing the operations of some other persons who had been more discreet and therefore more successful; and accordingly we visited the cocooneries of Mr. Curtis Carter of Henrico, near Richmond, and of T. S. Pleasants, at Bellona, between the 9th and 12th of June. We earnestly recommend to every one who feels interested in silk-culture, and has doubts as to its practicability, to make a similar visit to culturists who have taken some care, and exercised some judgment, to attain the end in view. No one can view the operations of an intelligent and judicious person in this business without seeing and learning something of value, even though some errors may also be equally obvious.

Mr. Curtis Carter has done more and earlier to show his confidence in the profit of silk-culture than any one in Virginia under similar circumstances. He commenced more than a year ago a cocoonery 130 feet long, 30 wide, and two stories high, which has already cost him more than $4000, and which he does not consider finished until it shall be supplied with stoves and flues, and is lathed and plastered, to preserve the dryness and warmth of temperature thus to be obtained. Mr. Carter is not an enthusiast. He is a prudent and judicious old man, who has earned by his own early labor and economy a competent fortune, without abandoning the habits of industry and frugality, and plainness of his comfortable living, which were necessary in his early life. His prudence and caution are apparent in his present operations. For after being so well provided, and at such great expense, he has still avoided increasing his rearings otherwise than very gradually. He took care not to hatch out many eggs until recently, and the early small broods, (of which he was then reeling some of the cocoons,) were raised mostly in his close brick hatching apartment, where fire served to secure a sufficiently warm, dry, and purified atmosphere. Though 10 ounces of eggs had then been hatched, most of the worms were as yet young, and his great cocoonery seemed almost vacant.

Reeling was then going on, upon two iron Piedmontese reels. The laborers were Mr. Carter's sons and daughters, who already reel well, though having had but a few weeks' practice, and without having seen the operation before, or having instruction from any one more experienced. The principal material used had been the last years' crop, between 30 and 40 bushels of cocoons made by Mr. Carter last summer. During our visit, the reeling was of cocoons of this year's product. We are not able to judge of this operation by comparison, or by acquaintance with the article prepared; but to our scant lights on the subject, it seemed that the execution was easy and rapid, and the product excellent. Those who consider the difficulty of reeling as the great obstacle to silk-

culture, will have that impression entirely removed by seeing the operation here.

It is not our purpose to describe the particulars of Mr. Carter's feeding operations, which, indeed, there was not time to observe carefully. He, as well as other persons to be mentioned, promised to furnish, for the Farmers' Register, detailed statements of results, having especial regard to the labor, the cost, and the products.

Mr. Schermerhorn's cocoonery being immediately on the route, was also visited. His building is 70 feet by 30, and of two stories. It was specially built for this purpose. The warming, in worst weather, is as yet but insufficiently and unequally effected, by a small common stove. An additional building, for the hatching room proper, is now in the course of construction. Mr. S. had hatched out the worms from 30 ounces of eggs, and they so far were in good condition. But the quantity is too large for the means and degree of experience, and we greatly fear a failure on account of that error, which so many others have also committed. With one fourth of the quantity, we would be very sure of the success of Mr. Schermerhorn's arrangements and labors.

At Bellona, the principal cocoonery in the main building, which is ready for use, had not been occupied. A smaller building, because more easily warmed, had been fitted up in a rough manner for the early broods. Of these, about 70,000 worms were in their last age of feeding, and some eight or ten small separate broods had finished spinning, and the earliest of them were then laying eggs. About 200,000 more were hatched but recently. All so far had succeeded well, with the exception of two particular parcels, (out of some 15 or more of different kinds,) which had turned out badly. Altogether, the success was abundantly gratifying and encouraging. Yet great disadvantages had been, and even then were suffered, in regard to the out-door laborers, which it is expected will soon be rectified. When Mr. Pleasants' subsequent feedings begin, in his large and admirable cocoonery, there is every reason to expect success, if zeal, care, and devotion of the head of the establishment can secure that result. So far, the superintendence and the credit for the success of these early operations, are indeed not Mr. Pleasants'; but belong to his sister-in-law, Miss D. Brooke, who has given to the rearing her continued and untiring care and labor. Seeing her success with these early and various small broods, (which caused so much the more difficulty, added to the generally operating difficulties of the weather,) induced us to beg that the like assiduous attention might be bestowed on a single and larger brood, and in a later and better season. We hope to be enabled hereafter to report the result of this rearing, which will be carefully observed and all the facts noted, in accordance with our suggestion and request.

One of the objects of Mr. Pleasants, in the early part of the season, (the best for the purpose in view,) is to provide eggs of all the best known varieties of silk-worms, and of healthy stock, and likely to produce healthy progeny; and this can only be secured by breeding from a healthy stock. This was the cause of his having so many different kinds of worms, and kept in separate and distinct lots. Much has already been lost by many individuals, from their own ignorance on this subject, and much detriment caused to the progress of silk-culture. Even the best informed and most experienced persons have yet much to learn on this branch of the subject. Very few persons take the care necessary to produce perfectly good eggs, or know what means should be used to retard their hatching afterwards, without injury to the vigor of a before healthy stock. It is a remarkable fact that the constitution of a diseased or feeble brood of silk-worms will certainly be transmitted to the next generation, even though the eggs shall hatch as well as of the best. We are further induced to believe that a neglected and much exposed and suffering brood of worms, though not thereby rendered unhealthy themselves, will lay eggs which will produce only a diseased and worthless progeny. Mr. Pleasants' operations in this respect are conducted with a degree of care and of rigor, which has been rarely if ever used in this country; and not only would he reject the whole of a diseased brood, but, of broods generally healthy, first every suspected worm is rejected, next every soft or otherwise inferior cocoon, and finally every feeble or inferior moth, should any such appear after the previous rigorous mode of selecting the best individuals. If such care can lead to the result, he will scarcely fail to reach the designed end of securing perfectly healthy and pure stocks of eggs of all of his different varieties of silk-worms. He has also been conducting a course of experiments in retarding the hatching of eggs, in an ice-house, (the means which, by being improperly used, have so often produced disappointment and loss,) and from the results already obtained, he is confident of being able to secure both the desired objects, of retarding the hatching to any time of the season, and yet preserve in perfection the vitality and the health of the stock.

The larger apartment at Bellona, already fitted up for the regular feeding, and soon now to be occupied by silk-worms, is 96 by 31 feet, and will furnish accommodations for 400,000 silk-worms at a time. Mr. Pleasants designs to hatch out 100,000

every 10 days until late in September. One such supply has been already hatched, in addition to the more advanced lots above named; and the eggs for the next succeeding brood have been taken from the ice.

So far, no particular facts have been stated of feeding operations except such as we saw, in some one or other stage of progress. In addition, we have been informed of several large, successful and altogether satisfactory rearings, in Brunswick, Amelia, Nottoway, Goochland, and in Norfolk county; though to the account from the last, were added statements of numerous losses having been suffered by reliance on diseased or damaged sale eggs. We had anticipated this result, from having obtained and made early trial of a small supply from the same source. From those experimenters who observed and noted their operations with sufficient accuracy to show the facts and their value, we hope to have reports of the results; and especially as to the amount of labor employed, and other costs, and the products actually secured. We shall not attempt to anticipate any of the reports by partial and probably inaccurate statements of what we have heard of them—or even of what we have seen. But as it may yet be in time to guard others from disaster and loss, we will merely here remark, that all the observations made concur in showing that among the things absolutely necessary for success, are plenty of fresh and renewed air, enough space for the worms, and cleaning of the shelves so often as to prevent any accumulation of damp or fermenting litter at any time, and still more frequent cleanings during the last days of feeding. And, though not so fatal in effect as neglect of these essential requisites, we will add as things to be avoided, the almost universal errors of feeding too heavily, and the use of very young, very luxuriant and succulent leaves, forming a very watery and therefore weak food, and serving to produce or increase dampness, which is the greatest of all causes of injury to silk-worms.

Since the above was written, the later and more full information received (to June 25th) has been still more encouraging, and the cases of success in greater proportion to the contrary. Some persons also who failed totally in their first, and too early trials of this season, have already advanced so far and so successfully in a second rearing, as to consider all danger over. Still, we deem no such operation as ended, and its worth known even to its conductor, until the cocoons are taken down, assorted, and measured.

We have conversed with, or heard from sundry persons who have failed either partially or totally, in rearings this spring; but, with a single exception only, the causes of failure were perfectly obvious to each individual, (and generally admitted to be the effect of bad management which might have been avoided,) and there was no discouragement, or change of opinion produced, as to the ultimate and general results of the business.—Ed. F. R.

THE SECOND PHYSICK HUMBUG.

"It is stated in the Germantown (Pa.) Telegraph that Mr. Philip Physick is now feeding, in his Highfield cocoonery, six millions of silk worms, and that he expects to feed fourteen millions more, making twenty millions in all, the present season. At present (as the Telegraph states) only two hands are engaged in the building, though a large proportion of the worms are winding, and some are three weeks old."

If the foregoing paragraph (which is now going the rounds of the newspapers,) is, indeed, (as we have no reason to doubt,) from the Germantown Telegraph, a paper published on the spot, and the statement was authorized by Mr. Philip Physick, then that individual has sent forth a silk-worm-feeding humbug that is almost equal to his famous (or infamous) multicaulis sale at the same place last autumn, and which we, (as well as most other persons,) were so credulous and foolish as to believe, (for a few days,) to have been a *bona fide* transaction; and as such republished the report of the prices stated to have been obtained. The only excuse we had for believing in the very strange facts reported, of such enormous prices being obtained at public auction for Mr. Physick's morus multicaulis trees, was that we *then* supposed it utterly impossible, not only that a man of great wealth and dignified connexions, and of high standing in society, should, for gain, commit so gross a moral fraud as the opposite facts would indicate, but, also, that he could secure the aid of any auctioneer of decent reputation, of clerks, of *respectable* bidders, making some twenty or thirty persons at least to aid in carrying the deception into effect; and further, that such a deception could be practised publicly before thousands of intelligent spectators, and that neither any of them, nor any of the business community of Philadelphia, should detect the trick, or if knowing it should not expose it to the public. On the contrary, the report of the sale was published as if true by every paper in Philadelphia and almost of the United States, and if any express contradiction of its truth was ever afterwards made, it has never reached our eyes. Yet, in two weeks after the publication, not an individual in the country remained deceived on the subject. This pretended sale was the last blast blown to swell the multicaulis bubble, and served to burst it effectually. And

though a like farce was soon after attempted in another great auction, by another multicaulis magnate, and of which heavy sales at high prices were published, no one was then so foolish as to believe in the truth of the sales, even while the auctioneer was crying the pretended bids.

Since his great and memorable sale, we have heard nothing more of Mr. Philip Physick, and had supposed that he had sunk into deserved contempt, and that he courted obscurity as his only remaining shelter and resource. But from the annunciation above copied, (if he is indeed the authority for it,) and which is scarcely less a humbug than the former report of his great multicaulis sale, it would seem that there is some new cause for his again seeking notoriety, and some new gain hoped for from thus publishing the unequalled and almost miraculous labors of the "*only two hands*" in the Highfield Cocoonery.—ED. FAR. REG.

MANURE FROM LEAVES. COW-PEAS.

From the Carolina Planter.

Mr. Editor:—As my signature denotes, I am more disposed to live comfortably, than to grow rich inconveniently; and the sentiments of my former piece evince that I am unwilling to derive more from my soil, than will leave it unimpoverished. It will scarcely prove a matter of surprise, therefore, that I treat in this article of what, to the enterprising, may seem a small matter.

My object is two old: first to exhibit to those, who, like myself, live where land is dear, and therefore valuable, an economical and convenient mode by which a large field may be planted, and yet improved, every year; and secondly, to invite all, who like myself again, (for I address those particularly who are similarly situated with myself,) are subject to the ravages of the chinch bug, to participate with me in the advantage of a crop which they will not molest, and which though equal to the same amount of corn or oats, is not appreciated nor enjoyed by the upper districts. I mean the cow-pea.

In the accomplishment of my first purpose, I will merely describe my own operations, as an illustration of the plan proposed. I have a parallelogram, 150 feet by 50, enclosed by a straight fence, in the midst of which, is a low house 96 feet by 24. A part of this is divided off into stalls for milch cows, in which they may be fed separately from the herd. The balance is open, with a rack running through its length, and dividing it; and the whole is surrounded with unsheltered margin, which prevents the stock from being necessarily confined within the limits of the building.

As soon as I lay by my crop, I haul out my bulk of manure, and deposit it in heaps around the field, or fields, for which it is designed; and then, having my laboratory empty and ready for operations, I commence the preparation of another supply.

First—I cover the whole area, in and out of the house, eighteen inches thick with oak leaves and pine straw—the common litter of the woods—which it takes me, with two horse carts, at 15 loads a piece a day, four weeks to accomplish. My first deposit, then, is 720 loads, gathered into heaps, and conveyed to the pen, in the following manner. As soon as I cease to work my crop, I put all my women and boys to "raking trash," by way of getting a start. In a few days I discontinue this operation, only keeping two elderly women to prepare for, and load the carts, which have been running from the commencement of the "trash raking." These carts are driven by boys, as experience proves that they will perform more, at that particular kind of business, than the primest men. To ascertain that the task (with me 15 loads—but dependent, of course, upon circumstances,) is given me honestly, I make the drivers empty the loads touching, but in distinct and undisturbed heaps, which remain so until I or my agent count them, and inspect their size. The carts are not stopped for four weeks; and consequently the two old women and the two boys take no share in stripping and curing fodder.

When I have my deposite complete, I adjust and level the whole, which will give a coating of not less than 18 inches deep. This I cover with the offal of my stables, which I have purposely delayed to cleanse. And this operation of cleaning my stables, and spreading their contents in a layer over the area of my cow-pen, is performed monthly. In the mean time my pen receives nightly additions from my stock of cattle, which are penned regularly throughout the year. Thus I make a compost which is stronger than cow-pen manure, and not so heating as stable. Directly after the Christmas holidays, and before I commence to plough in my oats, I devote a fortnight to the same operation that I described as occupying the two carts, and their four attendants, during the month of August. And after this I continue the process of strengthening the compost with the cleansing of the stables. As I have sides, a front and back, made of light laths, temporarily attached to my carts, while I am hauling trash—each load, light and dry as it is, and trampled down into the frame, will give a load of manure; and therefore on the first of each August, I have (720+360+220+(the monthly cleansing of the stalls of 20 horses,) 1300) thirteen hundred loads of compost to haul out. Of this I find that sixteen loads to the acre are sufficient not only to keep up, but to improve my clay lands. Thus the reward of my labor and trouble, is the ability to plant every year, and yet improve eighty acres of land.

Suppose I did not pursue this system, and what would be the consequence! I must either till that area to less and less profit every year, until I destroy its value entirely; or I must have an equal additional area with which to alternate it, and so be enabled to keep up both by resting. Eighty acres of land in my neighborhood, at $15 per acre, will cost $1200; and thus, besides the gain of an annual increased product, the saving of an investment of $1200 is made. And at what expense? Some trouble, I confess, but no loss; for no labor, human or brute, is substracted from the preparation for the planting, working, or harvest of, the crop.

It would be very easy to increase the quantity of manure made in this manner, if my means were more ample; but I am limited, both in the quantity of my available trash, and in the number of my cattle.

A few lines now, Mr. Editor, in fulfilment of my second design. Before the chinch bug made its appearance amongst us, it was easy enough for every farmer to raise as much corn and oats as his wants required. There was no occasion to cast about for, and bring into requisition, auxiliaries to those two staples of plantation support. Sweet potatoes, like the Irish, were regarded (as they unfortunately are even now,) as mere garden vegetables—a mere luxury, not a necessary; and cow-peas were considered to cost more in their harvest—occuring as it does in the midst of the cotton picking season, than they were worth. But a change has come over the face of things: and we must now harvest, at any cost, what our remorseless enemy will permit us to produce.

I regard it as impossible to devise means for the destruction of the chinch bug, as it is to account for their origin. Their whole existence is a mystery; and, if I may be allowed to use a seeming paradox, they are collectively the more formidable, from their individual insignificance. All that remains for us to attempt, then, is to counteract their tendency to reduce us to famine, by planting a variety of crops, and especially such as are exempt from their ravages.

Last spring, about the first of May, I planted seventy-five acres of my corn in cow-peas, and from them gathered, in the fall, a sufficiency of grain in the horns or pods, to sustain twenty animals, exclusively, for seven months; besides that those which were shelled by hauling were given to my negroes. The only additional labor they cost me arose from having to plough but one way, (which I regard as an incidental advantage to my land,) and the harvest, which occupied ten or twelve days in the fall.

They cannot be made in perfection, in the up country, if planted after the middle of May, I am convinced, by experiments made five years successively. Many, to save labor and trouble, plant them while laying by the corn; but I have never seen the attempt successful; nor ought we to complain that it is so, for in that way they would be made too easy to leave man's curse in operation. Nor do I approve of planting them on the side of the ridge, or in the centre of the middle: especially in the latter place, from which all the soil has been previously withdrawn. My plan, and it is borrowed from the invariable custom of the low country, where the pea crop is proverbial, is to drop from 6 to 9 grains between, and in a line with the corn, which stands 4 feet apart on the beds.

In the up country there is a prejudice that peas are unwholesome food for horses; but the experience of the whole low country is opposed to this theory.

A FRIEND TO MODERATION.

June 5th, 1840.

GREEN MANURES. BUCKWHEAT.

From the Cultivator.

Manures cannot be conveniently carried to all parts of a large plantation. They should therefore be applied to the fields near where they are made; and the more distant fields must be enriched with green crops. Tares are much used for this purpose in Europe, but whether these would grow as rank and as rapidly in our dry climate, we are not certain. We think they have not been extensively tried.

Oats have been sometimes sown to be ploughed in, but they give only a small layer when the land is poor. Rye will grow on poor soils, but we must use much seed, or we must let it grow tall, else we have but little to bury with the plough.

Round turnips form a good green crop for the plough, but they will give no top in poor ground. *Indian corn* has been recommended and partially tried. This is not more exhausting than oats or rye, and on fields not worn down low, probably no green crop would furnish more matter to be covered by the plough, than this one. But on quite exhausted land, this would not answer our purpose; and the quantity of seed necessary for such a purpose, would be four or five bushels, quite an objection with economists.

Buckwheat is a grain that will grow on most poor soils. It delights most in dry locations, a soil inclined to gravel or sand. It has many qualities that recommend it highly as an article to be grown for the purpose of filling the soil with vegetable matter, of which it has been much exhausted in the states of which we have spoken.

In the first place, it will grow and produce a handsome layer for the plough, on lands that will produce nothing else. In the second place, we do not find it an exhausting crop. We can raise it many years in succession on our poor lands without any manure, and we very commonly save fifteen or twenty bushels of the grain from an acre. This plant has a very small, fibrous root, and is easily pulled up by hand. It has also a large branching top that never could get its support from this root. It has therefore probably greater facilities for procuring nourishment from the atmosphere, than most plants have.

All theory and all experience unite in showing that this plant takes less from the soil, than any other of the same size. In the next place, it has a rapid growth, six weeks, in Massachusetts, being long enough to bring it in full blossom, when it should be ploughed in. Three crops may therefore be turned under in one season in Virginia, and then it will be early enough—(Sept. 1st)— to sow down with grass seed.

Another advantage attends the raising of this for grain or for green crops; the expense is not great. It usually bears the same price as our best corn, and is worth quite as much for fattening animals, and one bushel of seed is enough for the acre. When it is raised for the purpose of saving the grain, we often sow but half a bushel. The straw is also greedily eaten by the young cattle and by horses—colts may be wintered on it. Yet we have known large piles of this straw to be burned in the field where it was thrashed!

Now with this article—this old, neglected, abandoned, and abused buckwheat—we could soon renovate the once beautiful plains, formed from the washings of the gulf of Mexico, and laying between the Alleghany ridge and the Atlantic ocean. Much of this fine tract has been cropped, time out of mind, while nothing was grown that could make any adequate return for what was abstracted.

The natural advantages of this tract of country are superior, in our humble opinion, to the far-

famed west. And though the soil has been mismanaged and abused, a few years of correct husbandry would again restore it to its pristine value and importance. No critical niceties need to be observed, no nicer labors than the blacks are capable of performing, are required to bring these feasible soils again to fertility. And when they are brought to that state, there is no difficulty in keeping them there.

None of the various grasses are great exhausters of the soil, and grasses must form one of the series of the rotation of crops. When lands are kept half the time in grass, the roots fill the soil with vegetable matter that turns to manure directly on being turned by the plough, and, by means of raising more grass, more stock may be kept, and that increases the quantity of animal manures.

The policy of raising so many acres of corn on reduced land, must be abandoned. When more buckwheat can be raised on the acre than is obtained of Indian corn, it should be subsituted for corn in a great measure, for it requires not a sixth part of the expense to produce it—and when buckwheat is raised for its grain, if proper care be taken to sow something with it that may be turned in for a green crop in June, the land will prove more productive, year after year.

On the wet and clayey lands of that district of country buckwheat may not be sown. Such lands may be treated as we treat our grass lands of that character at the north. They may be turned over in autumn and seeded down again directly to grass.

ON THE CULTURE OF LUCERNE.

From the Albany Cultivator.

Respected friend, Jesse Buel—I some time since received a letter from thy father, requesting me to give him such information as I am possessed of respecting the culture of lucerne; and thinking thou wouldst like to have it, I have concluded to send it to thee, as I think every farmer who has land suitable for it, ought to have plenty of this valuable grass. It requires a good deep soil, that has not clay bottom. I have succeeded beyond my expectation, and now find no more difficulty in raising it than any other crop. In order to prepare the land for it, spread plenty of unfermented manure on it, and plough it in and plant corn, which ought to be well managed, allowing no weeds to grow. After the corn is taken off, give it a good deep ploughing, and let it remain in that state until spring, if it be sown with barley; but if with winter wheat, harrow it well, and collect the roots and loose stones, and should there be any fast stones they ought to be removed; then spread about forty bushels of ground bones per acre and harrow it in; but if bones are not to be obtained, any good rotten manure that has no seeds of weeds in it, will answer it. And as it is best to lay the land in ridges about 24 feet wide, open a furrow about 12 feet from the fence, and let the near horse return in it; then open another in the same manner, 24 feet from it, and so continue until the whole is finished; then sow the wheat and plough it in, not very deep, filling the furrows which were opened, and harrow it once over. As it is best to have it as smooth as may be, I made a hone with a plank about nine feet long, and two poles, pretty much the shape as those we smooth our roads with; and if it is not heavy enough lay a post or two on it. It ought to be so constructed as to draw the loose earth towards the furrows. In the spring, about the time clover seed is sown, sow about twenty pounds of lucerne seed to the acre, and harrow it in with a sharp, heavy iron-toothed harrow twice over, once each way, and roll it with a light roller, across the ridges, to be drawn by one horse. After the grain is taken off, let it remain in that state (not pastured) until spring. Soon after the frost is out of the ground, before it is much settled, harrow it once each way with the heavy harrow. I had mine pointed with steel. The harrow ought to be made in two parts and hung together with hooks and eyes; then it can readily be lifted up on one side by the driver, and cleared by a boy to accompany him with a rake. It may be harrowed three or four times over after every mowing, remembering to pick up the loose stones. The reason I recommended laying it in ridges is, because it can be more readily smoothed with the hone. If it is not smoothed, the harrow will not have the desired effect; and the natural grasses are apt to get in. I generally let mine stand until in blossom, when it is designed for hay. I usually get three good crops, and think the hay is better for all kinds of stock than any I have ever seen. My first crop has sometimes been so large, that it is best to cut it rather earlier, as it will sometimes lodge and may injure the roots.

As this grass requires more time to cure than some others, I thought it might be well to inform thee how I manage it. That which is cut in the forenoon, if the sun shines, may be turned with a rake towards evening, but not opened; and that which is cut in the afternoon may remain until the next afternoon, before turning it. That which was first turned ought to be turned the next forenoon, and put in cocks early in the afternoon, and let it remain two nights in cocks; then open it and lay the forkfuls separate, shaking it well, and if it does not appear to be sufficiently cured after being turned, put it up in cocks and let it remain one night more. When the hay is housed, I generally put half a bushel of salt to a load--say to about fifteen hundred.

As this grass, especially the first crop, is apt to be very large, it is liable to be injured by heavy rain when in cock. I would therefore recommend to those who raise it, to get a quantity of low-priced yard-wide linen cloth, and give it a thin covering with boiled tar, with a painter's brush, on both sides, and sift some fine sand on it while warm; and when dry, cut it in squares and fasten a small stone to each corner to prevent their blowing off the cocks. These cloths cost but little, and with care will last many years, and may be very useful for other kinds of hay; for want of them, one of my neighbors had a large quantity of clover hay much injured.

When the swaths are turned the second time, let two be turned towards each other, then when it is raked, the horse can walk between them, and let a boy keep by the side of the horse, and when the rake is full, let him open the swaths with a fork, that the rake may readily enter.

I have been thus particular, being desirous that whoever may wish to raise this grass, may succeed, as a number of my friends have been disappointed for want of proper management.

Thy assured friend, JAMES BYRD.

P. S. If the seed is sown on winter wheat in the spring, it ought to be done when the ground is neither too wet nor too dry, but when it will crumble.

Flushing, 2*d mo.*, 19*th*, 1840.

For the Farmers' Register.

MONTHLY COMMERCIAL REPORT.

The only indication of a favorable change in commercial affairs is the improved state of domestic exchanges, which, in the Atlantic states, with a few exceptions, do not exceed five per cent.: thus indicating a tendency to the resumption of specie payments. But it is remarkable that, with the largest crops ever produced in the west and southwest, the rate of exchange against New Orleans and Mobile has increased within the last two months.

The receipts of cotton, in all ports, reach nearly to 2,150,000 bales, against 1,315,000 to 1st July, 1839. The price has undergone little variation for some weeks; 6 to 9 cents embracing most sales, and 5 to 10 the extremes. Foreign markets have of course been influenced by the certainty of receiving larger supplies than can possibly be wanted by the manufacturers until another crop shall mature. On the prospects of this growing crop speculators must base their operations. As yet, the only disaster it has suffered, has been from the inundations of the rivers in all the cotton growing states.

The British manufacturers complain that there is no demand for goods for the supply of this country, and that one of their most important resources is thus cut off.

The export of flour and grain to England, which has been very extensive, will result unprofitably to the shippers; as, after the cry of deficiency and apprehended starvation, the prospect of a very good and very early crop this year has allayed all apprehension. Flour in Liverpool is worth but about 24 shillings sterling per barrel; being lower than in Havre and other French ports. The crop of wheat produced in the United States last year far exceeds that of any previous one. The supply from the states bordering on the lakes and the Ohio, seems to be inexhaustible.

The harvest in Virginia is now far advanced; and although not a very abundant, is considered a very good one. The weather has generally been favorable hitherto, and the quality of the grain is good. No price is yet established; but it cannot be high, when flour sells at $4\frac{1}{2}$ per barrel. Corn is worth 50 cents per bushel.

The crop of tobacco is also most abundant: that of Virginia is estimated to be 50,000 hhds., of Kentucky nearly the same, and of Maryland and Ohio, about 34,000 hhds. With so heavy a supply, prices are well sustained; the general sales at the inspections being from $3\frac{3}{4}$ to $11 per hundred. The small stocks held in Europe induce shippers to pay these prices.

Stocks are generally low, particularly those of banks, railroads, and manufacturing companies, whose operations are all injuriously affected by the deranged state of commerce and the currency.

To give an idea of the receipts of produce at New Orleans, those of the prominent articles, from October 1st to June 15th, are annexed:

Cotton, - - - - -	902,000 bales.
Tobacco, - - - - -	38,000 hhds.
Sugar, - - - - -	37,500 hhds.
Flour, - - - - -	450,000 barrels.
Whisky, - - - -	45,000 barrels.
Lead, - - - - -	220,000 pigs.
Bacon and pork, about -	33,500,000 pounds,

(including 4,700 hhds., 118,000 bbls., and 6,200,000 pounds in bulk,) besides many other commodities to a large amount. X.

June 24, 1840.

CONTENTS OF THE FARMERS' REGISTER, NO. VI. VOL. VIII.

ORIGINAL COMMUNICATIONS.

	Page
On the different proposed schemes of rotations	337
On the objections to marling in the south	341
Manuring	368
Remarks on corn culture, beans, &c.	369
The earliest notices of silk culture of this season	377
The second Physick humbug	380
Monthly commercial report	384

SELECTIONS.

	Page
Lucerne, or French clover	321
Agriculture of France	323
Essay on the nature and importance of agricultural education	331
Hot air furnace	338
The grape vine	339
Poultry	340
Remarks on the propriety of using marl in South Carolina	341
Extract from the report on the culture of the mulberry, and the mode of rearing silk-worms in the environs of Paris in 1836	343
Model filature at Philadelphia	349
Different soils in Kentucky, and the conjectured formation of the rich lands around Lexington	350
On shoeing horses	353
Harvesting of corn	354
Directions for clearing land	355
The bee-moth	355
On the cultivation of fruit trees	357
Notes on European agriculture	357
Rhode Island agriculture	363
Essex agriculture	363
Wire-worm	364
Gatherings from graveyards	365
Edgings for a flower garden	367
Powers of the Arab horse	368
Notes on northern silk-culture	370
Lime and lime burning	375
Manure from leaves. Cowpens	381
Green manures. Buckwheat	382
On the culture of lucerne	383

*** The communication on the "Analogy of the generation and reproduction of plants and animals," and "Remarks on the vegetable kingdom, soils, &c." will appear in No. 7.